Explicit government guarantees and subnational borrowing costs

The Dutch case: three empirical studies

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Contents

1 Introduction

Nations around the world are increasingly turning to decentralisation to improve the performance of the public sector. This is because subnational governments (SNGs) are believed to be more responsive to the particular preferences of their constituencies and therefore in a better position to align public services and investment with the needs of citizens. This development is accompanied by an increasing demand for substantial amounts of credit to finance investments at the SNG level. To ensure the proper and sustainable implementation of tasks, affordable and reliable sources of credit are of key importance.

For SNGs, the main sources of credit are the issuance of municipal bonds and bank loans. In many countries outside Europe, the issuance of municipal bonds appears to be much more customary than obtaining bank loans. However, in Europe, the opposite is the case, with credit to SNGs predominately in the form bank loans. In most countries of Europe, the public sector has set up public sector banks to make funds available at low costs and favourable terms. These banks are specialised in providing cheap, reliable and easy access to credit for loans to SNGs. Moreover, to remove or reduce the credit risk of SNGs, government guarantees are sometimes provided, either explicitly or implicitly.

For most countries, the highest attainable credit-risk guarantee is an unconditional guarantee provided by the central government. Usually, credit rating agencies will not give national institutions or SNGs a higher rating than their central government. After all, any guarantee is only as strong as its guarantor. Should a bailout be required, then the central government could be forced to intervene. Explicit government guarantees ensure that debtors can borrow at the most favourable terms, as a result of the ex-ante decision of the government to bail out. In the case of implicit guarantees, the guarantor will decide ex-post whether to provide a

bailout or not.

The Netherlands has put in place explicit government guarantees for municipalities and social housing associations (housing corporations). This phenomenon is typically Dutch and unique in Europe. Other countries are reluctant to provide explicit guarantees because they fear moral hazard, where debtors abuse financial facilities by over-borrowing, leading to unsustainable debt levels as a result of the security of certain bailout. Providing well-designed explicit government guarantees must go hand in hand with an adequate institutional setting and borrowing practice to prevent abuse.

The Netherlands has positive experiences with their guarantee system. This thesis investigates the design of the Dutch guarantee system and the inextricably linked institutional context that is necessary to reduce the risk of abuse. The Netherlands, with its explicit government guarantees, offers a unique opportunity for empirical research. This thesis includes three empirical studies, all related to borrowing costs.

This thesis uses the borrowing costs on credit for SNGs as a starting point. There are two main reasons for this choice. Firstly, the unique Dutch setting of government guarantees where SNGs can borrow with explicit government guarantees enables a level playing field suitable for empirical research. Secondly, we have access to a unique and rich micro-level dataset on the borrowing costs of SNGs.
In the Dutch context, all SNGs borrow with an equal credit risk (i.e., zero risk) and should be able to get the same terms for identical loans. To be absolutely clear, this was the situation during our research period, which ranges from 1997-2014. Since 2014, European supervisory authorities force banks to assess all credits and apply credit risk surcharges, even to those

assessed as risk free.

A study of credit markets would not be complete without an examination of the role of financial intermediaries. In this thesis we do not analyse credit markets however; instead we use credit as a standard commodity and the related borrowing costs as the starting point for our research. We explore the public domain of government guarantees. The Dutch setting for government guarantees, where SNGs borrow with explicit government guarantees has proven sustainable but is not self-evident. This unique Dutch setting needs further investigation for a better understanding of borrowing with explicit government guarantees. This forms the foundation for our research. There is as yet no literature available that fully describes the Dutch institutional setting and borrowing practice in this context, and therefore Chapter 2 and Chapter 3 will focus on these issues.

In the Netherlands all SNGs have access to the same providers of credit. In this thesis we focus on the borrowing costs for credit from the main sector bank, BNG Bank. In our research we only use loans that are actually made and interest rates that are actually paid. This information is not publicly available, only BNG Bank has allowed to access the database to disclose this information. We have no information from other suppliers of money. For this reason we focus on BNG Bank only. All SNGs in this study deal with the same provider of credit. This setup ensures the likelihood that SNGs are treated in the same way by the bank, following the same procedures and using the same pricing curve. The pricing curve incorporates the actual market situation, all banking costs (inclusive costs of refinancing risk) and the required margins. The use of the same pricing curve levels the playing field for SNGs for these elements. This approach, and the focus of this study, make it less relevant to analyse the supply side of the credit market.

We use this unique Dutch setting to study three economic and societal problems:

- Firstly, the provision of guarantees generates considerable debate in the literature. While most countries in Europe provide implicit guarantees to SNGs, it is of interest to explore whether, and to what extent, making such government guarantees explicit could help to lower borrowing costs. Lower borrowing costs could lead to lower costs for providing public services. To this end, Chapter 4 investigates the effects of explicit government guarantees on the borrowing costs of housing corporations and municipalities.
- Secondly, as a result of the decentralisation of government tasks to SNGs, in many countries, municipalities seek opportunities to encourage a more efficient delivery of services. Two possible solutions are municipal amalgamations and intermunicipal organisations (IOs). However, questions arise about the efficiency implications of such choices. In this respect, the Dutch setting allows a completely novel approach to measuring efficiency. Because municipalities and certain IOs are covered by a uniform guarantee system, the interest they pay on loans with the same characteristics should in theory be the same. However, it takes some effort to arrange a loan at minimum cost. Chapter 5 argues that differences in interest rates on identical loans can be viewed as an indication of differences in efficiency.
- Thirdly, SNGs who take loans have limited possibilities to minimise borrowing costs. They mainly depend, aside from some room for bargaining, on the loan offers from banks and on market conditions. One subject that is much discussed in the financial departments of SNGs is whether an optimal moment to arrange a loan can be found, aiming to lock in the best interest rate. Lower borrowing costs could lead to more room to finance public services. Chapter 6 compares five different timing-based decision rules, all easy to implement at low costs by SNGs, and explores whether

some strategies outperform others under different performance criteria.

This thesis adds to the literature in various ways. To the best of our knowledge, research on explicit government guarantees has not been done before. Moreover, empirical studies on bank loans as a source of credit for SNGs are very limited. This study thus adds new research to the existing literature. Finally, we apply a novel approach to compare the efficiency of intermunicipal organisations with the efficiency of municipalities.

1.1 The rationale for government guarantees

In Europe, the dominant source of credit for SNGs is bank loans (Halling et al., 2016), with municipal bond issues lagging far behind (Schultz & Wolff, 2009; Caperchione & Salvatori, 2012). The studies available on SNG borrowing costs by means of bank loans are limited. Batisda et al. (2014) investigate the municipal borrowing costs of bank loans in a Spanish institutional setting, which differs from the Dutch setting as it provides other forms of government guarantees and does not protect against default. The study finds that accounting information provided by municipalities exerts an influence on the credit price policy of the banks with respect to the municipalities. If their conclusions also hold for the Netherlands, we would expect that borrowing costs will depend on the financial particulars of the debtor. By the same token, Navarro-Galera et al. (2015) develop a loan price model for Spanish local governments to determine borrowing costs, which includes financial factors as well as social, demographic and political drivers. Here, the question arises whether these findings also hold in the Dutch setting.

In theory, borrowing costs are influenced by the credit risk of the debtor. In the absence of unconditional guarantees, debtors with different levels of credit risk will have different

borrowing costs and opportunities to access credit. Such an uneven playing field could be less desirable for SNGs, which are expected to provide comparable public services. Government guarantees, however, can help to realise a level playing field with respect to borrowing costs and access to credit. Implicit guarantees go hand-in-hand with uncertain bailout expectations, which may be reflected in borrowing costs. To remove uncertainty in relation to bailout expectations, guarantees can be made explicit. However, it is unclear whether and to what extent this influences borrowing costs. A major advantage of providing explicit guarantees (in contrast to subsidies for example) is that they need not cost society anything.

The idea of providing explicit guarantees meets considerable resistance in the economic literature (Kornai et al., 2003; Rodden, 2006) because it is believed to be inextricably linked to moral hazard. Even if there are no explicit guarantees, banks might expect a bailout in any case (implicit guarantees), for economic or political reasons (Kalamov & Staal, 2016), as actual bankruptcy could entail high costs to social wellbeing as well as other political costs (Goodspeed, 2002; Plekhanov & Singh, 2006). Indeed, there are numerous examples of bailouts actually occurring despite the existence of a formal no-bailout clause (Heppke-Falk & Wolff, 2008; Rodden, 2006). These bailout expectations may have resulted in lower interest rates.

However, loan guarantees might not be fully credible either, which could result in higher interest rates. If no differences are found in interest rates, this could be interpreted as a redundancy in the explicit guarantee, leaving room for moral hazard. Nevertheless, in the Netherlands, explicit government guarantees are part of the institutional setting of municipal borrowing and that of housing corporations as well. The Netherlands has positive experiences with explicit guarantees, and bailouts seldom occur (Allers, 2015). Nonetheless, making use

of explicit guarantees demands an adequate and sustainable institutional setting and borrowing practice. This is necessary to reduce the likelihood of abuse.

Given the setting described above, it is of interest to investigate the effects of explicit guarantees. To our knowledge, this is the first study in this field, as the existing literature focuses on implicit guarantees. Chapter 4 tests whether and to what extent explicit guarantees lower borrowing costs, and whether they are successful in creating a level playing field for borrowing costs. To evaluate this guarantee system, the effect on borrowing costs is compared with the actual bailout payments during the period 1990-2014. Of course, outcomes in the past do not predict future performance, and the cost of a bailout system go beyond actual bailout spending. Nevertheless, such a comparison can help put things in perspective. In addition, Chapter 4 compares two different explicit guarantee schemes, in order to determine whether they have the same effect on interest rates. The results of this study could support countries that wish to design an adequate setting for explicit guarantees with the aim of lowering borrowing costs.

Chapter 4 tests three hypotheses. The first and second focus on the interest spread, which is defined as the difference between the actual interest rate paid by the SNG and a risk-free reference rate. The first hypothesis tests whether the guarantee does what it is designed to do; that is, to lower interest rates.

Hypothesis 1. Unguaranteed loans have higher interest spreads than guaranteed loans.

Another goal of the guarantee is to create a level playing field for borrowing costs. To this end we test Hypothesis 2 and investigate the influence of housing corporation characteristics on interest rates in the case of guaranteed and unguaranteed loans.

Hypothesis 2. *Housing corporation characteristics do not influence the interest spread of guaranteed loans.*

The bulk of the existing literature concludes that higher debt leads to higher interest rates. With Hypothesis 2, we can test whether the characteristics of a housing corporation's financial position, such as higher debt (or riskiness), influences interest spreads for unguaranteed loans compared to guaranteed loans. The findings provide an indication of the extent to which the lending banks, over our research period, relied on the credibility of the guarantee (bailout clause) and the assessment of the supervisory authorities. From this we can deduce whether the guarantee system was effective in removing credit risk.

In the Netherlands, we distinguish two forms of explicit guarantees: that of housing corporations, which may default, with a guarantee fund that secures individual loans; and that of municipalities, where the guarantee secures the entire financial position and protects against default. It is not inconceivable that these differences will be reflected in different interest rates. Therefore, we investigate whether housing corporations and municipalities pay different interest rates on equivalent loans.

Hypothesis 3. *The interest rate on guaranteed housing corporation loans exceeds the interest rate on municipality loans.*

If we find no differences in interest paid, we may conclude that the two different forms of government guarantees have the same effect on interest rates.

1.2 The efficiency of different types of SNG

The existence of risk-free credit provides an interesting opportunity to study differences in the efficiency of SNGs. In the absence of credit risk, interest rates should only depend on loan modalities, credit market rates and the effort on the part of the borrower to secure a good deal. With sufficient data, the first two determinants can be controlled for and the latter estimated. When, for example, intermunicipal organisations systematically pay higher interest rates than municipalities for equivalent loans, it might be deduced that they operate less efficiently. This is the topic of Chapter 5.

This is a highly relevant issue. In many countries, the small size of local government is increasingly thought to lack the necessary scale to operate efficiently. Two possible solutions to this problem are amalgamation and intermunicipal cooperation. Each of these options may have very different implications. Amalgamations often lead to public resistance because communities fear loss of autonomy or identity. Moreover, amalgamation is a blunt instrument, as services offered by municipalities are quite heterogeneous. While some services (e.g. capital intensive) may operate under economies of scale, the opposite may be true of other services. Hence, increasing scale across the board might encourage efficiency gains in some public services but efficiency losses in others. In addition, amalgamation may result in more bureaucracy. Larger jurisdictions may be less able to tailor local services to local demand (Oates, 1972).

Intermunicipal cooperation offers municipalities a way to increase the scale of production for selected public services, while continuing to provide other public services on a municipal level and preserving local autonomy. Cooperation may thus allow municipalities to exploit economies of scale (Bel et al., 2013), but it may also have effects that reduce efficiency. Corporate governance theory predicts that cooperation exacerbates agency costs and reduces the intensity with which the activities of public servants are monitored. Thus, a control system combining monitoring with sanctions and rewards (henceforth referred to as 'monitoring') is needed to align public servants' objectives with those of citizens.

Agency theory suggests three possible reasons for reduced monitoring and, as a result, less efficiency in intermunicipal organisations (IOs). Firstly, it introduces an extra tier in the hierarchy: the board of the IO. Adding hierarchical layers increases monitoring costs. Secondly, monitoring could be further hampered by the fact that a municipal government's grip on an IO is weaker than that on their own organisation. Thirdly, intermunicipal cooperation in effect creates a common pool. When a particular municipality puts a lot of effort into monitoring an IO, much of the ensuing efficiency gain will benefit other participants. As a result, the level of monitoring is likely to be lower than that for the operations of the municipality itself. As this disincentive to monitor is a result of the existence of a common pool, its strength will depend on the size of this pool. Dispersed ownership of IOs, or the number of partners cooperating in an IO, could influence the level of monitoring. The 'law of 1/n' states that the level of monitoring will deteriorate when the number of owners increases.

A lower level of monitoring could result in higher borrowing costs if the absence of rewards or sanctions results in less effort to realise the best interest rate for the organisation. Staff of

the client desk of a bank have commercial targets. The interest rate set on a loan in this oligopolistic market may vary within small margins (indicative up to 10 basis points, i.e. 0.1 percentage point). This is the result of a bargaining process. The room for negotiation is determined by the bank's pricing model (which is kept secret for reasons of competition), the requested spreads and the competition. Banks keep track of failure and success rates for loan offers (quotes) at an overall level. Periodically, banks will adjust the spreads to reach the required levels of success. These failure and success rates are also recorded at a client level. Banks' client desks are well aware of the nature of their individual clients and will find ways to realise commercial targets. Clients who always accept a first loan offer or loan offers from the same bank, i.e. loyal clients, will end up with a higher interest rate. This higher interest rate could be interpreted as a form of inefficiency because there is no economic reason to accept such an offer. This brings us to our first hypothesis related to efficiency.

Hypothesis 1. *Intermunicipal organisations (IOs) pay higher interest rates than municipalities on equivalent loans.*

Higher interest rates paid by IOs might point to inefficient borrowing practices, but this is not the only possible explanation. In this respect, note first that there are two forms of IOs: guaranteed public companies and public bodies. Because public companies can default and municipalities and public bodies cannot, creditors could charge the former higher interest rates to cover possible legal or administrative costs of enforcing a loan guarantee. However, the higher interest paid by public companies would then not be the result of inefficient borrowing practices. The following hypothesis is designed to test this possibility.

Hypothesis 2. *Public companies do not pay higher interest rates than public bodies.*

If we observe no difference in interest rates between public bodies and guaranteed public companies, this would mean that IOs pay higher interest rates than necessary (i.e. there is no economic reason for doing so). A difference in interest rates between municipalities and IOs might also be due to differences in bargaining efficiency (e.g. collecting market information, negotiating). However, more bargaining effort would only be advantageous if the benefits of putting in this additional effort exceeded the costs. This brings us to the third hypothesis.

Hypothesis 3. *The benefits of an additional bargaining effort by IOs would exceed costs.*

If Hypothesis 3 is supported, less bargaining effort would reflect inefficiency, because there is no economic reason to do so. The question then arises of why IOs would make less effort in bargaining. This may occur when efforts are not, or are less strictly, monitored and when the lack of rewards and sanctions encourage other objectives than a best rate for the organisation. As we saw above, agency theory suggests three possible reasons for reduced monitoring and, thus, less efficiency in IOs: the introduction of additional hierarchical layers; the limited influence of municipality governments on IO boards; and dispersed ownership of IOs. We can test the validity of the latter explanation by investigating whether interest rates increase as the number of participants in an IO increases. Several papers (Weingast, 1979; Primo & Snyder, 2008) argue that inefficiency due to common pool effects increases with the number of participants; the phenomenon called the 'law of 1/n', mentioned above. This brings us to the fourth hypothesis.

Hypothesis 4. *The interest rate paid by IOs increases as the number of participating municipalities increases (i.e. the* 'law of 1/n' *holds).*

Amalgamation, which is an alternative to cooperation, might also affect monitoring efforts. Recently amalgamated municipalities may be less able to monitor their borrowing activities. Amalgamation is an arduous process that may have severe disruptive effects on managerial behaviour and organisational outcomes; for example, because of poor staff morale, loss of managerial expertise due to increased turnover or work overload. At the same time, amalgamation may have a beneficial effect on efficiency. Existing organisations usually have well-established ways of doing things, which may have become outdated. Amalgamation forces organisations to reconsider procedures and operations, possibly resulting in the adoption of more efficient practices. This leads to the following hypothesis.

Hypothesis 5. *After amalgamation, municipalities pay higher interest rates than non-amalgamated (or recently amalgamated) municipalities.*

Our final hypothesis investigates whether a decision to amalgamate rather than form an IO influences interest rates.

Hypothesis 6. *Interest rates paid by recently amalgamated municipalities are lower than those paid by IOs.*

1.3 The impact of the timing of a loan on borrowing costs

SNGs who take loans have limited possibilities to minimise borrowing costs. Because loans to Dutch municipalities are risk free, they can be arranged at very short notice. Banks are happy to lend money to municipalities and do not need to assess credit worthiness. One phone call or email suffices to secure a loan that may start the same day. This allows municipalities to

closely control the moment in time they arrange a loan. The question arises whether municipalities can optimise the timing moment in order to lower borrowing costs. Lower borrowing costs could lead to more room to finance public services.

In cases where credit is needed, this need is usually known well in advance. Existing loans coming to maturity need to be refinanced and funds are needed for investment projects; none of this will come as a surprise in any well-managed organisations. This provides borrowers with the option to choose the moment when a loan is arranged. Rather than waiting until the funds are needed to execute payments, a loan can be arranged earlier using what is known as a 'forward start'. This means that there is a time lag between the contract date – the date the loan is arranged and the interest rate set – and the date the funds are made available.

In the Netherlands, forward starting loans are quite common in SNG borrowing practice. Forward starts may have different motivations. Firstly, a forward start may appeal to risk-averse borrowers. By arranging the loan as soon as the need for capital has become clear, a cost increase as a result of rising interest rates is prevented. Secondly, loans may have to be approved at meetings of high-level officials that take place at various intervals; for example, as part of a budget for a project. If finances will be needed in six weeks' time and meetings where a loan can be approved are held monthly for example, a forward start of several weeks is to be expected. Finally, and most relevant for this study, a forward start may be chosen by a borrower who expects the interest rate to rise. By arranging the loan immediately at the current rate, the loan will be cheaper – provided the borrower was right.

The mainstream literature shows that it is difficult to outperform a prediction that is equal to the current interest rate. That is, the best prediction of the rate tomorrow is the rate today. This

does not mean, by definition, that it is impossible to find a timing-based decision rule that reduces interest rates. For example, does it make sense in a period of volatile interest rates to wait until the interest is somewhat lower? Chapter 6 tests the success of five strategies that might be employed to choose the moment a loan is arranged, using actual interest rates only.

1.3.1 Strategies related to timing a loan

In Chapter 6, we test whether interest rates on loans might be optimised by finding the right moment to arrange a loan within a 20-day time slot. In fact, this is called an 'optimal stopping' problem, where an irreversible choice must be made under conditions of uncertainty and within a finite time horizon (Peskir & Shiryaev, 2006; Allaart, 2012). A well-known example is the secretary problem (Ferguson, 1989), where the best secretary must be selected from n applicants. The optimal decision rule (in fact, an approximation that moves closer to the optimal one as n increases) is to dismiss the first[1] n/e candidates, and then select the applicant who is better than the best candidate up to that point. In the case of a better candidate not appearing, the latter candidate is chosen.

Our case differs from the secretary problem with respect to some of the assumptions and the objectives. Nevertheless, it is interesting to determine whether this optimal stopping strategy can help minimise interest rates.

In this study, we investigate five strategies that are easy to implement at low costs. We test the performance of these strategies using daily interest rates for the previous two decades.

The first strategy is a passive strategy. It looks back to choose the best interest rate in a certain

[1] Here, e is the base of the natural logarithm: approximately 2.72.

[2] Bernard van Ommeren (2019), responsible credit risk assessments municipalities BNG Bank.

time period and sets this rate as the reference rate for the following decision period. The loan is arranged at the moment that the current interest rate is lower than or equal to the reference rate. If this is not the case, the loan will be arranged on the last available day. The second strategy is slightly different: it is an active strategy, which means that the reference rate is set on every new day. The third strategy uses the drift of the market, in other words, the positive or the negative difference between a past interest rate and the rate at the beginning of the decision period. If the drift is upwards, the loan is arranged immediately; if it is downwards, the loan is arranged on the last available day. The fourth strategy follows the classic secretary approach. No historical data are used. Instead, a waiting period is created, during which the best interest rate is set as the reference rate. The loan is arranged as soon as the current interest rate is lower than or equal to the reference rate in the following decision period. If this is not the case, the loan will be arranged on the last available day. The final strategy is the simplest: always choose a fixed day to arrange the loan, for example always select day 1, day 2 or another fixed day in the decision period.

We shall see that there are substantial differences between the performance of these strategies and that the policy implications will depend strongly on the goal that one wants to achieve.

1.4 Reading guide

The core of this thesis consists of three empirical research papers, as described above. However, before turning to these papers, for a better understanding of the unique Dutch setting in which SNGs can borrow with explicit government guarantees, Chapter 2 clarifies the institutional setting in the Netherlands, that is, the tiers of government and the financial institutions and their roles related to municipal borrowing. In Chapter 3 we describe the

practice of municipal borrowing, practical issues concerning municipal borrowing and a quantitative description of contracted loans. The subsequent chapters present the three main studies. Chapter 4 investigates the effect of explicit government guarantees on the borrowing costs of housing corporations and municipalities. Chapter 5 applies a novel approach to compare the efficiency of SNGs with the efficiency of municipalities. Chapter 6 explores whether the right timing when arranging a loan can help achieve lower interest rates, while Chapter 7 presents the general conclusions.

2 Institutional context of municipal borrowing

This chapter addresses the institutional setting of municipal borrowing in the Netherlands, starting from a European perspective. This is necessary for a better understanding of the unique Dutch setting of municipal borrowing with explicit government guarantees. There is as yet no literature available that fully describes this unique setting. However, before we start to describe this setting, we will elaborate on the relevancy of this analysis.

2.1 The relevancy of the unique Dutch setting

Every country has its own unique setting how municipalities are financed. In the European context, this financing mainly takes place in the form of bank loans to municipalities. For lenders, this automatically implies the risk of bankruptcy of the borrower, with all its consequences. Most European countries have regulations to protect munipalities against bankruptcy (e.g. Belgium, Denmark, England, Germany, Netherlands, Spain). For some countries, it is not clear how potential bankruptcy is handled (e.g. France, Italy). Only a few countries in Europe allow municipalities to go bankrupt (Austria, Hungary, Switzerland). The United States of America also allows municipalities to go bankrupt and consequently offers protection against creditors through a Chapter 9 procedure. All this does not make the Dutch setting unique: European countries provide some form of financial assistance when municipalities face budgetary problems. While this has not been stipulated in a formal bailout duty, it is reflected in implicit bailout expectations. The design of the bailouts strongly differs between countries based on certain conditions e.g. legal basis, type of help, eligibility, procedures, causes, etc. The Netherlands is the only country that has stipulated an unconditional formal bailout duty for all municipalities. This explicit government guarantee is enshrined in law. This is what really makes the Dutch setting unique.

It is interesting to analyse a setting that makes such an unconditional bailout duty sustainable, given the moral hazard problems this may cause. Moreover, such an unconditional bailout duty relieves lenders from the duty to thoroughly assess the credit-worthiness of municipalities. Lending to municipalities can be effectuated in a highly efficient way with a minimum of costs and lead times. This could be reflected in the low interest that municipalities pay on their loans as well as the easy access to these loans, both a result of the Dutch setting.

The uniqueness of the Dutch setting makes it complicated to explain and for others to understand. Even in 2019, the European Central Bank (ECB, acting as a supervisor of bank lending) has requested that the main Dutch public sector bank provide a fully qualitative description of the rationale of lending without credit risk surcharges[2]. This is socially relevant as understanding the Dutch setting may be necessary to continue the current lending procedures for municipalities, which provide easy access to money at low interest rates and thus leave financial room for more public facilities. This chapter may be helpful in providing this information. The academic relevance of this chapter lies in the study of the institutional context in a country that offers formal unconditional bailouts in the form of explicit government guarantees, without encountering the moral hazard problems the literature would predict (Kornai, Maskin, & Roland, 2003; Rodden, 2006) and over-borrowing (Litvack, Eskeland, & Rodden, 2003).

2.2 The European perspective

The Netherlands is a founding member of the European Union (EU), a geo-political entity covering a large portion of the European continent and founded upon numerous treaties.

[2] Bernard van Ommeren (2019), responsible credit risk assessments municipalities BNG Bank.

Members of the EU are completely free to design procedures and protocols to finance their local governments, and there are a variety of mechanisms used, based on different historical, political, cultural and social backgrounds. To enhance price stability within the eurozone, political criteria have been set with regard to central and local government debt levels and deficits.

From a monetary perspective, price stability within the eurozone is the primary objective of the ECB.[3] When price stability is met, room is created for lower interest rates to enhance growth. The ECB is directly governed by European law, and has a corporate structure, with the EU Member States (national central banks) as shareholders. The ECB directly influences prices for short-term capital by setting the interest rates for banks that rely on such credit. Money market prices for banks with access to ECB credit (e.g. in the case of refinancing) do not differ substantially. These short-term prices in turn influence long-term prices through the shift in preferences of maturities. The ECB is increasingly using longer term monetary tools to directly influence prices for long-term credit.

Although a well-functioning ECB is a precondition for stability, national central banks do play an important role in securing access to money, also in difficult times. Stability in markets is crucial for ensuring access to money against reasonable prices.

The banking industry regulations are based on a set of recommendations known as the Basel Accords: Basel I, II, III and the forthcoming IV. The recommendations must be adopted by national supervisors and enforced by national law or European laws, and there are also

[3] Price stability is defined as an inflation rate of 2% or a little less.

regulations such as Credit Requirement Directives and Credit Requirement Regulations.[4] The main objective is to align own funds with bank exposure. Exposure with negligible credit risk is zero-risk weighted, which means that no additional risk capital is required. In the Netherlands, decisions about the level of credit risk applied to capital requirements are taken by the national supervisor – the Dutch Central Bank (DNB) – and formalised in regulations.[5]

2.3 The Netherlands

The Netherlands can best be described as a decentralised unitary state. It consists of twelve provinces and 388 municipalities (2017). In accordance with their respective powers, the majority of competences still remain with the central government. It is within the power of central government to create, amalgamate and terminate a municipality. However, this rarely occurs, and most amalgamations are bottom-up processes. Financial and juridical rules applicable to a municipality and the division of tasks and powers are determined by the central government. Municipalities are democratically governed jurisdictions with their own broad set of responsibilities. To fulfil these, certain tasks and powers are partly delegated to municipalities, which leaves them free to decide how to spend their budget within the boundaries of the legal requirements.

Municipalities are allowed to borrow money to perform their public tasks, mainly relying on national sector banks for loans. Until recently, the DNB acted as a supervisor of these sector

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[4] In the Netherlands, the Financial Supervision Act (*Wet op het financieel toezicht*, Wft) regulates solvency requirements.

[5] Art. 2.8, Regulation of Capital Requirements for Credit Risk, and its explanatory notes, annex 2B, lapsed on 01-01-2014 and were replaced by a phased implementation of CRD IV and CRR regulations (Regeling solvabiliteitseisen kredietrisico en grote posities Wft 2010, vervallen per 01-01-2014). CRD IV and CRR incorporate the Basel III recommendations, which introduced a minimum 'leverage ratio'. This is a non-risk-based leverage ratio and is calculated by dividing Tier 1 capital by a bank's average total consolidated assets. The banks are expected to maintain a leverage ratio in excess of 3%.

banks, but as of 2014 this authority was transferred to the ECB. In this role, it maintains an overview of risk and capital requirements of individual banks to prevent bankruptcy and instability. The required levels of capital influence the price of credit and, of course, equity is not free: investors demand a return on their capital. The DNB has assigned lending to municipalities, or under municipal guarantee, the status of zero-risk weighted exposure, an equal risk weighting as that of the State of the Netherlands. This means that banks do not have to allocate credit-risk capital, which in turn keeps interest rates low. The possibility of default is negligible because the legal system triggers predefined processes to avoid such a situation. Therefore, a Dutch municipality cannot default (see Section 2.4).

Loans provided to Dutch municipalities (or to debtors under municipal guarantee, as well as certain guaranteed funds) may be used as collateral in Monetary Policy Operations of the ECB. Because of these regulations, Dutch banks are able to finance municipalities against favourable prices, particularly banks with higher credit ratings. Since 1945, no municipality has defaulted on its debt service, demonstrating the effectiveness of the framework.

2.4 Municipalities

Municipalities in the Netherlands are relatively large compared to those in other European countries. As a result of a continuous amalgamation process, the average size of municipalities has grown from 29,600 inhabitants in 2000 to 43,800 in 2016 (source: Statistics Netherlands). The decentralisation of national tasks to municipalities is an ongoing process and puts pressure on municipalities to operate efficiently. An alternative to amalgamation, and widely used, is intermunicipal cooperation (see Chapter 5). In the section below, we describe Dutch municipalities according to the tasks they perform, their organisational form, the way

they are financed, accounting standards, supervision by the province and the bailout mechanism. The legal and regulatory framework can be found in the appendix to this chapter.

2.4.1 Municipal tasks

Municipal tasks and related expenditures are extensive. Dutch municipal and regional public sector expenditures amount to 33% of total public expenditure.[6] The main areas of these expenditures are education 28%, social welfare 15%, general services 8%, health 2%, economic affairs 18%, and 28% other (e.g. housing and community amenities, public order and safety, recreation and culture, environment and defence). Direct capital expenditure of the municipal and regional public sectors amounts to 65% of total public capital expenditure (source: CEMR factsheets).

Municipalities perform many tasks that are of direct importance to the inhabitants. In addition to their legal responsibilities, municipalities have autonomy regarding public service provision. However, there is much public and political pressure to provide an implicit 'minimum level' of public services. Examples of legal tasks include: the registration of inhabitants, the issuance of official documents, social welfare and school facilities. Public service provision related to local policies might include, for instance, developing zoning plans, infrastructure projects and local investments.

Municipalities are required to present a balanced budget. The municipal council has the exclusive right to allocate and approve this budget. Execution of this budget is in the hands of the municipal executive (the board of aldermen and the mayor). If the policies of central government lead to changes in the duties and activities of municipalities then, under Section 2

[6] CEMR (2013), Factsheets: A figure-based portrait of local and regional Europe, CEMR, Brussels.

of the Financial Relations Act, a specification must be given of any financial consequences to the municipalities, and the means by which these are to be financed must be indicated. In practice, the division of duties between central government and the municipalities, as well as the financial resources required, are subject to intensive consultation between central government and the municipalities.

2.4.2 Municipal organisation

The municipal organisation is laid down in the Municipalities Act. Every municipality has a council and a board of aldermen and a mayor, which represent the inhabitants of the municipality, determining local policy and controlling the execution of it. The number of councillors depends on the size (inhabitants) of the municipality. The mayor is the chair of the council. The mayor is not elected, but nominated by the municipal council and appointed by the central government. The board of aldermen and the mayor represents the municipal executive. The mayor is the chair of this board, while the number of aldermen amounts to at most 20% of the total number of councillors, with a minimum of two. The aldermen are selected by the municipal council and have political responsibility for their allocated portfolio of tasks. The municipal council cannot bind the municipality to external parties, only resolutions from the municipal executive can do so. However, if executives do not follow the directives of the council, the council can dismiss them, thus giving the council the power to enforce political wishes.

The ongoing decentralisation of tasks has had its effects on municipal organisation. In this dynamic environment, municipalities are exploring ways to increase operational excellence in order to meet new conditions. To this end, new forms of intermunicipal organisation are being considered. In addition, municipal amalgamation has also been considered as a possible way

to enhance efficiency. The choice of a specific solution is complex and depends on many factors. Sometimes amalgamation would be too blunt an instrument, as up-scaling every service may not be optimal, while intermunicipal organisations may create common pools leading to inefficiencies. Chapter 5 elaborates on these issues.

Municipal executives are 'horizontally' supervised by the municipal council, elected through proportional representation every four years. The Municipalities Act (Art. 189) stipulates that the council must ensure that a municipality's budget is balanced in a structural and material way. 'Structural' balance means that the budget presented is consistent with previous years and years to come, while 'material' balance means that the budget reflects the true state of affairs. The structure and authorisation within the municipality, as defined in the Municipalities Act, are organised so that both the council and the municipal executive are countervailing powers with regard to budgetary spending. However, the municipal system of budgeting and reporting is complicated and open to interpretation.

2.4.3 Municipal revenues and finance

Dutch municipalities depend heavily on funds provided by the central government, with relatively little power to raise taxes themselves. This vertical fiscal imbalance makes it difficult for municipalities to cope with substantial financial setbacks.

To a large extent, fiscal disparities between municipalities are aligned through an elaborate grant system (Allers & Vermeulen, 2016). This system aims to ensure that municipalities are able to provide similar service levels at similar tax rates. The allocation formula in the grant system (the Municipal Fund), although cost oriented, is chosen in such a way as to prevent municipalities from influencing the amount of grant they receive.

Municipalities enjoy, within statutory limits, a certain degree of autonomy in determining the taxes to be levied and their rates. The relevant regulations are laid down mainly in the Municipalities Act, Sections 216-257. Municipalities are prohibited from levying taxes based on income and wealth; the most important tax they do levy is a property tax. Municipal income from all taxes and levies add up to 17% of the budget.[7] Shortages used to be financed with revenues from profitable land development programmes.

In the Netherlands, SNGs may borrow unlimited amounts within a balanced budget. The budget is accounted for on an accrual basis. According to this standard, costs and expenditures may be incurred that will be accounted for at a later date, conforming to the pay-as-you-use philosophy. As a result of this, the budget may be in balance but at the same time indicate a cash shortage, which needs to be funded with credit to execute the necessary payments, resulting in increasing debt levels. Borrowing within a balanced budget can be achieved as long as the interest on loans and depreciations of investments are covered by the budget. The loan amount and the investment are not part of the budget and are presented on the balance sheet. A balanced budget thus says nothing about the availability of money to achieve this balance, and it is possible that new loans are required. This is in contrast to the central government, which balances the budget on a cash basis, meaning that no additional loans are needed. Dutch SNGs borrow under a form of government guarantee, but because of a lack of discipline in the working of the market on the level of interest that must be paid, regardless of the level of debt or economic performance, this could lead to unsustainable debt levels and financial distress. However, in the Netherlands, SNGs do not go bankrupt and bailouts rarely occur.

[7] Statistics Netherlands.

Regulations concerning municipal activity on the money market and the capital markets are laid down in the Financing Act and the Decree on Loan Conditions. These aim to limit interest risk exposure resulting from municipalities' funding activities. For instance, the volume of short-term funding is limited to a percentage of the budget (Art. 4, Financing Act). The interest risk on long-term borrowing is limited by choosing the modalities in such a way that refinancing risk does not exceed a certain percentage of the budget (Art. 5, Financing Act). The applicable percentages are defined in the Implementation Rules.

Municipalities may only borrow in euros (Art. 1, Decree on Loans). Moreover, they may not become a party to index linked loans (Art. 2, Decree on Loans). Pursuant to the Financing Act, municipalities may only enter into derivative transactions if these transactions are entered into for the purpose of limiting the financial risks of the municipality. Financial transactions may not aim to generate income by accepting more financial risk (Art. 2a, Depositing Fund Regulation and Art. 2a, Financing Act). Only a couple of specified derivative transactions are allowed (Art. 4, Depositing Fund Regulation). Investments or borrowing of funds by municipalities are only permitted to the extent they benefit their public function (Art. 2, Financing Act). The assessment of public function is the responsibility of the municipal council (Section IX, Municipalities Act).

2.4.4 Accounting standards and the budget

Budgetary regulations, as described in the Municipalities Act and the Decree on Budget and Accountability, rest on the following principles:

- the budget of a municipality must be balanced – only deviating from this principle if it may be assumed that the budget will be balanced in the following few years (Art. 189, Municipalities Act);

- a medium-term budget estimate must be made for a minimum of three years following the budget year (Art. 190, Municipalities Act);
- pursuant to the Decree on Budget and Accountability, budgetary risks which may be of substantial significance given the financial position of the municipality must be specified in a special section of the budget (interest rate exposure would be a case in point).

The municipal annual report includes the financial statements. These statements must be audited by a certified accountant and compiled according the Decree on Budget and Accountability. The financial regulations leave a lot of room for interpretation. Consequently, the accountant may play an important role in determining how to balance the budget and also, as a result of this, comply with additional political wishes. An audit by a certified accountant is not mandatory for the annual budget.

2.4.5 Financial supervision and bailout

The provinces are an intermediary layer between the central government and municipalities and are responsible for the financial supervision of the municipalities within the provincial boundaries. This legal responsibility is laid down in the Municipalities Act, aiming to enhance financial soundness and to prevent municipalities from having to fall back on central government support in case of financial distress. Ensuring a balanced budget is the responsibility of the municipal council, with any financial imbalance indicated in a budget deficit. A structurally and materially balanced budget must be presented to the province (Art. 189, Municipalities Act). The interpretation of this structural and material balance may differ between municipalities and provinces.

The most usual form of monitoring is ex post supervision. In this case, the province receives the financial statements, the budgets (including a multi-annual budget projection) and any other required documents (Arts. 200; 203, Municipalities Act) from the municipal executive. As long as the information is received in time and budgets are found to be structurally and materially balanced (Art. 203, Municipalities Act), supervision will remain ex post and the budget of the following year will be approved by the province. The municipality is then free to spend the approved budget.

However, if the information is not received in time, or if the budget is considered to not be balanced, then the province will request that the municipal council take measures to constrain the municipal executive, although provinces cannot force municipalities to take measures. However, if these are not taken, the following year's budget cannot be spent. Any expenditure must be approved ex ante by the province. To prevent such a situation occurring, municipal executives do their best to come to an arrangement.

Ex ante supervision can be described as follows:

- If the budget of a municipality is structurally out of balance in the opinion of the provincial authorities, the municipality will be placed under ex ante supervision. This means that the budget requires the approval of the provincial authorities (Art. 203, Municipalities Act). In the event that the budget is not approved, the provincial authorities must approve every single expenditure incurred by the municipality above a certain euro threshold (Art. 208, Municipalities Act). If the municipal council should authorise any expenditure which the provincial authorities do not approve, the

members of the council who voted in favour of authorising such expenditure may be held personally liable (Art. 210, Municipalities Act).

- Debt servicing of loans contracted by a municipality forms a mandatory part of the budget and consequently has priority over non-mandatory expenditure. Provincial authorities may order the municipality to repay such debts if the municipality omits to do so (Arts. 193; 195, Municipalities Act).

If, in spite of these actions, the municipality still fails to achieve a balanced budget, it may receive additional financial assistance by means of an Article 12 procedure. Article 12 of the Financial Relations Act stipulates that a municipality may receive a supplementary grant if revenues are significantly and structurally insufficient to cover necessary outlays while local tax rates are sufficiently high. Grant money is taken from the municipality fund, from which grants to all municipalities are paid. Thus, it is not the budget of the central government but grants to other municipalities that suffer when a municipality is bailed out. A municipality has to ask for a bailout before it will be considered. Whether or not a bailout is granted will be decided by the national Ministry of Internal Affairs. If a bailout is not granted, the municipality must first comply with supervisory requirements (e.g. selling assets). If a bailout is granted, Article 12 comes into force and additional funds are received.

In 1967, the first year in which bailout grants under Article 12 of the Financial Relations Act were provided, 15% of all municipalities were bailed out (Allers, 2015). As the number of small municipalities steadily fell due to amalgamation, and the fiscal equalisation system was refined, bailouts became less frequent. Since the gradual introduction of an elaborate new grant equalisation system in 1997-2005, bailouts have become a rare event. This equalisation grant is formula-based, so implicit bailouts through this grant do not occur, unlike, for

example, in Germany (Fink & Stratman, 2011).

Before the new equalisation scheme was in place, bailouts were often believed to result from insufficient means, combined with nationwide minimum standards for local public services (Allers, 2015). Thus, there was no stigma attached to bailout. Since then, however, each municipality is expected to be able to finance the standard package of local services while levying a standard tax rate. Thus, municipalities bailed out after 1997 are much more likely to bear responsibility. Typical bailout grants vary between EUR 150 and EUR 400 per inhabitant per year, with typical bailout periods of up to three to four years (Allers, 2015). If the central government believes that the fundamental reason for the troubled financial position of a municipality is local mismanagement, a bailout may still be granted. In such cases, however, local tax rates above the normal rates may be required. In addition, in some cases, the province may require a long-term recovery plan, which will affect the budget for a longer period.

There is a different bailout system for housing corporations. This is described in Section 4.2.2.

Appendix: Municipal borrowing: the legal and regulatory framework

Municipal debt finance in the Netherlands is set within a complex and overlapping network of legislation and regulations. An overview of the applicable rules with an explanation is given below.

Legislation and regulations

This set of legislation and regulations is the result of an elaborate democratic process of balancing the needs and wishes of all the stakeholders. Therefore, it is not easy to improve or reproduce this framework, as all parts are deeply interconnected. This makes it difficult to copy. We have divided this appendix into three parts; the Constitution and Acts (with mandatory national parliamentary approval), Decrees and Ministerial regulations, and local regulations.

Constitution and Acts

- The Constitution (*Grondwet*).

The fundamental rights of citizens and the organisation and division of powers within the government (also between the central government, provinces and municipalities) are described in the Constitution. The purpose of the Constitution is to protect citizens.

- The Municipalities Act (*Gemeentewet*).

The Municipalities Act specifies: the organisation and the authority of the municipality; the fundamentals for administrative procedures and the budget process; the division of powers between the municipal council and aldermen; the legal responsibilities; possible taxes to be levied. Municipalities are obliged to balance their budgets in a structural way. In 2002, a dualisation of municipal administration was introduced, with municipal executives (aldermen) fully responsible for executing the approved budget on the one hand, and the municipal council setting the municipal framework to approve and control the execution of the budget on the other. The purpose of this Act was to ensure an efficient and transparent democratic process.

- Common Regulations Act (*Wet op de gemeenschappelijke regeling, WGR*).

This specifies: the organisation and the authority of intermunicipal cooperation; the fundamentals for administrative procedures and the budget process; the division of powers between the municipal council and the general board of the cooperative body; legal responsibilities. Note that the general board of the intermunicipal organisation approves the budget, not the municipalities involved. The purpose of this Act was to clarify the

organisation of intermunicipal cooperation. As this Act does not regulate a bailout, the articles of association should state that as a last resort all the municipalities involved will act as creditors should there be a shortfall.

- Sustainable Finance Act (*Wet Houdbare Overheidsfinanciën, Wet Hof*).

As a result of European budgetary agreements between countries on how to deal with EMU debt and budgetary deficits, the Sustainable Finance Act was brought into force in the Netherlands. This Act allows the national government to intervene if deficits and debt levels of local governments are not in line with the regulations of the Act.

- Subnational Government Financing Act (*Wet financiering decentrale overheden, Wet Fido*).

This Act clarifies how to act financially prudently, i.e. how to avoid overly high interest risk. Furthermore, the Act states that in a situation of a cash surplus, the means should be placed in the National Treasury, if not used to finance other local governments. It stipulates that financing activities are only allowed to support the performance of public tasks (as approved by a municipal council). The purpose of this Act is to create a common basis on how to act prudently.

- Financial Relations Act (*Financiële Verhoudingswet*).

Financial relations between the central government, provinces and municipalities are regulated in the Financial Relations Act. This is of great importance due to vertical and horizontal imbalances in the Dutch system. Taxes are largely levied at central government level and partially transferred to local governments, with limited local tax authority.

<u>Decrees and ministerial regulations</u>

Decrees and ministerial regulations are more flexible and more easily adjusted than Acts because they do not need national parliamentary approval.

- Decree on Budget and Accountability Provinces and Municipalities (*Besluit Begroting en Verantwoording*).

This governmental Decree is based on Art. 186 of the Municipalities Act. It stipulates the details and the requirements of the budget, the multi-annual estimates and the annual accounts and reports. The purpose of this Decree is to enhance transparency and comparability of the budgets and the annual accounts.

- Local and Regional Government Authorities Decree on Funds and Derivatives (*Regeling uitzettingen en derivaten decentrale overheden, RUDDO*).

This stipulates how to deal with surplus means and derivatives. It states that derivatives are only allowed to reduce financial risks and that open positions are not permitted.

- Local and Regional Government Authorities Decree on Loan Conditions (*Besluit leningvoorwaarden decentrale overheden*).

This ministerial regulation stipulates that local governments may only borrow in the euro and that principal amounts are not permitted to be indexed.

- Local and Regional Government Implementation Rules of the Subnational Government Financing Act (*Uitvoeringsregeling financiering decentrale overheden, UFDO*).

The conditions on how to mitigate interest risk and how it is calculated are set out here. The purpose of this is to find common ground for interpretation and calculating interest risk. Because percentages may differ over time, some flexibility is needed, and therefore this is not included as part of the Act.

Local regulations

- The Decree ex Article 212 and the Municipal Treasury Regulations (*financiële verordening ex artikel 212 en Treasurystatuut*).

The Municipalities Act, Article 212, stipulates that each municipality lays down a decree regarding this Act. The Decree not only declares the principles of financial policy but also the management and setup of the financial organisation. This Decree aims to regulate financial requirements and needs approval by the municipal council. It should provide sufficient comfort for the council to manage its financial situation. In practice, however, this Decree ex Art. 212 is nothing more than a rough outline of financial principles. For this reason, more details are given at an operational level in the Treasury Regulations. Any changes to the Decree must be approved by the municipal council, while Treasury Regulations must be approved by the municipal executive, as these changes are considered to be a further elaboration of the already approved Decree. Together, the Decree ex Art. 212 and the Treasury Regulations provide the requested information in line with the Municipalities Act. Most Municipal Treasury Regulations are comparable because most municipal treasuries have adopted the initial format suggested by the BNG Bank. Furthermore, other financial legislation, such as the Sustainable Finance Act and the Subnational Government Financing Act, are elaborated on in this Decree and the Treasury Regulations. The purpose of these regulations is to maintain a clear and transparent treasury policy. This can also assist creditors to gain a better understanding of the borrower, who is authorised to do what, what financial products are allowed, and so on.

3 Municipal borrowing: practice

This chapter addresses some key features of the practice of municipal borrowing with explicit government guarantees. These key features reinforce the sustainability of the guarantee system and are part of the unique Dutch setting. To start, we will explore the different credit sources for municipalities. The national sector banks play an important role, while other financial institutions (i.e. commercial banks, pension funds, asset managers, life insurance companies, intermediaries and foreign banks) play a minor role. However, they all support the financial stability of the Dutch capital market. Municipalities can also access capital markets directly by issuing bonds, although there is not much activity in this field. We will elaborate how the bank sets interest rates in this oligopolistic market. Furthermore, we will distinguish three main forms of municipal borrowing: balance sheet finance, project finance and borrowing through intermunicipal organisations. An important tool in municipal borrowing practice is the use of an annual treasury plan, which will also be addressed, as will the process of borrowing. We conclude the chapter with an overview of the types of loan agreements available and a quantitative description of total debt, amortisation schemes and types of loans. The appendix to this chapter presents the relevant provisions of the general terms and conditions of credit from the main Dutch public sector bank.

3.1 The relevancy of the municipal borrowing practice

The academic relevance of this chapter lies in studying a number of key elements of the municipal borrowing practice in a country with formal unconditional bailouts in the form of explicit government guarantees, whithout the expected moral hazard problems (Kornai, Maskin, & Roland, 2003) and over-borrowing (Litvack, Eskeland, & Rodden, 2003).

Alongside obtaining a clear view of the institutional context of the Dutch setting it is important to understand how municipalities actually borrow in such a setting. The existing literature is rather silent on this matter. A European study on how municipalities keep control of their borrowing levels (Dafflon, 2002), finds that municipalities are usually obliged to balance their budgets, that they are subject to some form of borrowing restrictions and that they are controlled by a higher level of government. The Netherlands is not included in this study. In the Dutch context, these findings are confirmed by Diamant et al. (2016). With a view to borrowing costs however, these studies lack a clear view on the borrowing practice.

3.2 Tapping the credit markets

Because of the legally enshrined bailout system (Section 2.4), Dutch municipalities can access credit markets at favourable conditions. Below, we discuss the different sources available. Foreign banks in the Netherlands offering services to municipalities are not active in lending. They do, however, offer asset-related services and special products, such as derivatives.
In the Netherlands, only a select group of banks provide credit services to municipalities: ING, ABN Amro, Rabobank, BNG Bank and NWB Bank. The first three are commercial banks, while the latter two are sector banks specialising in lending free of credit risk. The small margins on risk-free credit do not enhance activities from a commercial perspective (Fitch, 2014). Low funding costs and a sufficient lending scale are essential to operating profitably in this market. Therefore, commercial banks that have lower credit ratings than sector banks play only a minor role. In effect, competition mainly takes place between the two sector banks, although there are always opportunities for commercial banks to make more interesting offers. Most municipal treasury regulations include a provision that at least two banks should be contacted when taking a long-term loan, but this does not mean that

commercial banks are always consulted.

3.2.1 The sector banks

Sector banks are founded and owned by public entities; whether the central government, municipalities, provinces or district water boards. Their main objective is to service the local public sector and government-backed organisations by providing easy and sustainable access to credit at affordable prices. In addition, shareholders obtain a 'reasonable' return (dividend) on their equity. This means that sector banks also have commercial targets. The two Dutch sector banks, BNG Bank and NWB Bank, have a market share of 70% and 20% respectively of outstanding long-term loans to SNGs.[8] Sector banks are funded on the international capital markets and have access to cheap money due to their high credit ratings. This is reinforced by the likelihood of government support as a result of their public policy mandate (Birry, Hauville, Roy, & Ashworth, 2013). Both sector banks have been ranked at the top of the list of the world's safest banks by Global Finance.[9]

To obtain best prices for their clients, loans are priced on a daily and real-time basis. Cheap credit also means low operating costs and a low risk profile for the entire bank.

Shares in sector banks can only be held by Dutch public entities. These shareholders approve the appointment of members of a supervisory board, which is composed of experts in the field of government (local or otherwise) as well as financial experts with the responsibility of supervising the bank's managing board. In turn, the managing board is involved in the price-setting process for loans.

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[8] Estimation marketing department BNG Bank.

[9] Global Finance, 2015.

Founded in 1914, BNG Bank is a statutory two-tier company under Dutch law (*structuurvennootschap*). This means that considerable shareholder power is shifted towards the supervisory board, such as the power to appoint the managing board. This was done because, in the past, shareholders made little use of their governing powers. Half the bank's share capital is held by the Dutch State and the other half by municipal authorities, provincial authorities and one district water board. BNG Bank was established in The Hague and has no branch offices. It finances itself mainly by issuing bonds. After the State, the bank is one of the largest bond issuers in the Netherlands. BNG-issued debt securities are rated AAA by Standard & Poor's (S&P), Aaa by Moody's and AAA by Fitch. In addition, the bank has been awarded the highest possible Bank Financial Strength Rating (A) by Moody's.[10] The bank's articles of association limit lending to clients subject to some form of government involvement. As a result, the vast majority of the credit portfolio comprises loans to and/or guaranteed by local governments and housing corporations. Due to the virtual lack of any credit risk in this portfolio, the process of assessing and lending credit to these clients is structured on a 'straight-through' basis, lending directly from the client desk. All other lending assessed as a credit risk (maximised to 10% of total long-term lending) is preceded by a credit-worthiness analysis that serves to allocate the relevant internal rating and determine the risk premium. BNG Bank employed 290 FTE in 2016, with a total asset base of EUR 150 billion.

NWB Bank was founded in 1954 as a sector bank and is comparable to BNG Bank. It offers short and long-term finance arrangements exclusively free of credit risk to the public sector and government-backed organisations. The bank is funded through international capital

[10] Research period 1997-2013, rating reports are available on the website: www.bngbank.nl/investors.

markets. NWB Bank is a public limited liability company with shares owned by local governments, mainly water boards. In contrast to BNG Bank, with its State holding of 50% of shares, the State is a minority shareholder in NWB. The bank is an 'ordinary' public limited liability company, which means that shareholders have significant powers, such as the power to appoint the managing board and the supervisory board. NWB Bank employed 53 FTE in 2016, and had a total asset base of EUR 91 billion. It has a substantial share in credit to water boards and only a small share of municipal credit.

3.2.2 Other financial institutions

Other institutions operating on the financial market are pension funds, asset managers and life insurance companies. They manage enormous sums of assets necessary to finance their future liabilities. As they look for an optimised return in order to match future liabilities, lending to municipalities used to be of value in times of high interest rates. However, as a result of interest market developments, they are no longer as active as they were before.

In addition, intermediary parties are active in the lending market, not by lending directly themselves but by finding the best offer for their clients, in this case, the municipalities, which pay a commission for this service. Intermediary parties play a role in situations where banks are not willing to quote or to offer a competitive market price. This can be the result of bad business relations, or the bad timing of a request (e.g. near closing market and closed books). Banks might also consider that they have been maltreated by a borrower who asks for a quote only for reference purposes, taking the risk of competitive quotes with no upside potential. Another reason for this practice is the increase in failure rates (rejected loan offers), which will have a negative effect on commercial targets.

3.2.3 Issuing municipal bonds

As noted, issuing loans or municipal bonds only plays a limited role in the Netherlands, with an outstanding total of 2% of total municipal debt in 2015.[11] Issuing bonds, compared to bank lending, has advantages and disadvantages. The main advantages of bonds include potentially better interest rates and pursuing borrowing according to one's own terms and conditions. However, issuing bonds requires access to the capital market, which can be costly and cumbersome. Municipalities have to issue in a sufficient size, invest in a good reputation, disclose requested information to investors and adopt an adequate level of transparency. For this reason, banks may act as an underwriter to facilitate this arduous process. At the same time, bank lending is open to all municipalities and offers competitive interest rates with a lot of convenience and flexibility to satisfy individual needs.

During the financial crisis, the issuing of municipal bonds came to a halt. Municipal borrowing from well-capitalised sector banks thus appears to be more crisis proof than the municipal bond market (Fungáčová et al., 2013).

The most active party in facilitating these bond issues is BNG Bank, which offered a Medium Term Notes Programme to Dutch municipalities starting in 1998. This particular programme is still running and enables municipalities to have direct access to the European Capital Market.[12] Moreover, within this programme, it is possible to issue loans and tradable bonds with maturities ranging from 2 to 30 years. With BNG Bank acting as the arranger and paying agent, issuing bonds by means of this programme incurs operational costs. These types of bonds generally have a limited secondary market and more price volatility than debt securities

[11] Internal data BNG Bank.

[12] The following municipalities were active in this programme (2001-2014): Amsterdam, Arnhem, Breda, Delft, Eindhoven, Emmen, Enschede, Gorinchem, Groningen, Haarlem, Helmond, Maastricht, s-Hertogenbosch, Spijkenisse, Terneuzen, Tilburg, Urk, Utrecht, Velsen and Zaanstad.

issued by central governments. Moreover, illiquidity may have a severely adverse effect on the market value of these bonds. Dutch sector banks have never stopped lending to municipalities, even when markets became distressed.

3.3 Setting the interest rate by the bank

Knowledge of the interest rate setting process of the bank is important for an understanding of how interest rates are set and how these can change with no apparent market reason to do so. This will clarify why comparing rates of different banks remains useful for borrowers and how competing banks operate to realise their targets.

Sector banks borrow long-term capital on the international capital markets by means of bond issues.[13] Because of their high credit ratings, they are well served. To finance the funding needs of the bank as efficiently as possible, these bonds are issued with different maturities, principals and currencies, and are well spread over time. Proceeds of these issues are hedged immediately against interest rate and currency risk. Short-term borrowing is obtained through the money market based on Euribor rates.

Before the start of every business day a pricing yield curve is built, a norm price for bank loans free of credit risk. The pricing yield curve for bank loans is based on a formal term structure model. Personnel involved in pricing decisions cannot influence surcharges or discounts on this normative yield curve. Pricing models include real time (daily), variable (monthly) and fixed (annual) components.

[13] Savings/deposits positions are negligible for funding.

Building this normative pricing yield curve takes into account market developments with respect to funding and refinancing risk, resulting in a variable component, a surcharge or a discount, according to the respective maturities. Furthermore, a fixed cost component is added based on a yearly estimate that is the same for all maturities. After entering the relevant daily benchmark rates into the model, the interest rates for bank loans are set by the system. These norm prices are applicable to all risk-free credit clients. In addition, a commercial margin is negotiated, which may be positive or negative (or a risk premium in case of non-risk-free lending).

The variable component is evaluated on a monthly basis. The initiative to do this is in the hands of the treasury department of the bank. The request is evaluated by the management team and, if needed, a member of the managing board. If the evaluation results in a 'no change' assessment, the process stops. If a change is proposed, this new proposal will be evaluated by the risk-control department. If no problems arise from a risk perspective, the request is transmitted to the appropriate department for input into the primary database. The same process is followed for the annual fixed cost component.

The process of setting a price yield is strictly regulated. Once agreed upon, the pricing yield curve is adjusted in the primary database system of the bank. The client desk that sets interest rates for municipalities is informed about the pricing yield when accessing the system. During the day, the client desk evaluates the pricing yield in order to identify whether market rates differ substantially from the initial setting for the day. This is done by tracking the yield of the German Bund. If yields differ substantially, the client desk will adjust the commercial margins in line with the observed change. For this reason, it is important for municipal treasurers to be aware of market developments during the day. If interest rates drop during the

day, it is not a matter of course that the client desk will offer a lower rate – negotiations are needed to obtain a better result. At the same time, it is not a matter of course that the client desk will charge a higher interest rate should market interest rates rise in the course of the day, either due to laxity, their belief in a temporary interest movement or with an eye to increasing turnover.

Because of this interest rate setting process, sudden changes in interest rates offered to clients are possible even when market rates do not move. If competing banks have no parallel timed interest rate setting processes, rates can suddenly differ between banks. Another reason why interest rates between banks may suddenly differ is the specific liquidity position of the bank. This can make a loan welcome or not, influencing the interest rate, especially for the short term. For these reasons, among others, a provision is often included in municipal treasury regulations which stipulates that an offer from several banks should be requested when arranging a loan.

Operating in this oligopolistic market[14] also influences interest rate setting. The banks keep track of failure and success rates for loan offers (quotes), and these rates are evaluated periodically. If success rates are assessed as high, it is assumed that there is room for a higher setting of the pricing yield curve. This will leave the client desk to realise a lower commercial margin. In contrast, if failure rates are assessed as high, this will probably lead to a lower setting of the pricing yield curve. Furthermore, these failure and success rates are also recorded at a client level. Clients that always accept a first loan offer or loan offers from the same bank (loyal clients) will end up with a higher interest rate. Personnel at the client desk have commercial targets, one of which is a low failure rate. For this reason, they are keen to

[14] Which is assumed to be the case when individual banks have a market share greater than 50% (which is the case in the Netherlands).

make loan offers with a high success rate. Successes result from the low funding costs of the bank and astute negotiation, but also from a comparative interest rate setting advantage (composition of the pricing yield curve) with respect to other banks.

3.4 Municipal borrowing

Dutch municipalities make use of five basic forms of credit: current account, day loans, short-term loans (cash loans), long-term loans and loans with floating interest rates and/or floating principal amounts. A credit facility agreement may comprise all basic forms of credit. For some municipalities, often only a current account with an applicable interest rate based on the daily Euribor is included in this agreement. As municipalities have easy access to other kinds of loans against competitive rates, there is no need for additional agreements. A credit facility agreement or a loan agreement includes an agreement letter and a term sheet.

While arranging a loan, the municipal treasury decides the modalities of the requested loan; that is, the loan amount, the maturity, the starting date, the fixed interest period and the repayment schedule. After authorisation in compliance with municipal procedures, the municipal treasury can contract the loan. The bank offers an interest rate with no other costs or fees applied. For loans with a credit assessment (i.e. loans with credit risk), the bank will, however, charge higher interest rates and sometimes an arrangement fee to cover the costs of the loan process.

Any conceivable amortisation scheme can be priced and is available. To facilitate procedures, loans can be arranged and made available on the same day. For additional convenience, it is possible to arrange loans with a defined forward starting period. However, this may result in

an extra interest charge. If agreed upon beforehand, modalities such as principal amounts and interest may change during the maturity of the loan. Loans are available for up to a period of 50 years; although, due to financial turmoil, shorter maturities are more common.

The main reasons for the existence of long-term loans are investments (new loans) and refinancing. In addition, loans can be the result of a mismatch between money inflows and outflows. These loans can be both short-term or long-term. The difference is of importance because regulations differ according to this label (Arts. 4, 6 of the Municipalities Act). A short-term loan is defined by an initial fixed interest bearing period of less than one year – anything longer would be considered long term. When liquidity is needed for payments, current account credit (labelled short term) might be used, but this leads to higher interest rates. If money is needed beyond the current account credit limits, this could lead to an expensive overdraft. To avoid these costs, municipalities aim for current accounts of zero. A current account is not a loan but a credit facility and, accordingly, requires a credit agreement. Of course, it is possible that municipalities borrow long term for short-term purposes. This is not against the rules when acting within the framework of the Financing Act, as long as the municipal budget is balanced.

When a municipality decides to invest, borrowing can be accomplished in three different ways: balance sheet finance, project finance or borrowing through intermunicipal organisations.

3.4.1 Balance sheet finance

In the case of balance sheet finance, loans are not linked to specific projects. Balance sheet finance is based on projections of future need for liquidity of the entire municipality.

Liquidity plans with a multi-annual horizon help the municipal treasury to decide on how to finance liquidity gaps. A liquidity plan comprises operational, financial and investment cash flows. While operational and financial cash flows are easy to target, investment cash flows are much more difficult to control. As a result of delays, as well as uncertain inflows and outflows, and especially overestimations of investment budgets, only part of the budget may be executed. Consequently, financing the liquidity gap remains difficult. Only experience in dealing with the investment budget can help to prevent over or under-financing.

Once a realistic plan has been made, the subsequent challenge concerns how to finance the liquidity gap, choosing to do so with long and short-term loans and/or current account credit with various modalities. Planning is crucial, as early loan redemptions may incur high costs and are only possible if the bank is in agreement. Moreover, being over-financed incurs interest charges that could be avoided. Furthermore, deposits only offer low returns, and current account credit and overdrafts are expensive and limited by regulations.

3.4.2 Project finance

In the case of project finance, as the name suggests, a specific project is financed. Two main forms of project finance can be distinguished:

- without a legal entity;
- with a private/public legal entity.

In the simplest form of project finance, without legal entity, an administrative distinction is made for a defined project. Such a project cannot borrow from a bank directly and so the municipality borrows on its behalf, extending this loan to the project financing of the investment. This form is used in situations where the progress of the investment is difficult to

plan or substantially differs from normal practice. Not allowing these uncertainties to interfere with the normal planning and control cycle is then sometimes considered preferable.

Some activities or investments that substantially differ from usual municipal practice, with regard to risk, financial or organisational perspectives, are usually hosted in separate legal entities.[15] These can apply for a sector bank loan on the condition that public involvement is sufficiently substantial. Such a legal entity is not assessed as free of credit risk (except in the case of a municipal guarantee being applicable). Assessed with credit risk, it must comply with credit assessments, annual credit reviews and bank covenants. This is done only after an approval of the client loan application (compiled by the client manager of the bank) by the credit committee of the bank. Once a credit request is approved, an arrangement fee is charged and a credit-risk surcharge is applied to the normative pricing curve. Receiving bank finance for loans with credit risk is not an easy process. A loan application requests the following information:

- general information on activities and legal structure, which is duly reviewed by the bank;
- financial exposure to banks and the bank's financial return on the client;
- an explanation for the application (purpose of borrowing and overview of cash flows for reimbursement of the loan, explanation of why the loan is of importance to the bank, demonstration that debtor is compliant with the bank statutes);
- financial analysis of and projections on solvability, liquidity (cash flows), financial return;

[15] E.g. forms of public-private cooperation.

- risk analysis of all relevant aspects (such as land development projects, and risks associated with land allocation, land purchase, execution, sales and finance) must be elaborated on;
- accepted types of collateral;
- checks on bank covenants (e.g. loan to value, cash flow to costs of borrowing, cash flow to paid interest);
- assessment of managerial quality (e.g. a history of realising budgets).

Acceptance of such a credit application is far more complex and time consuming than applying for a loan that is free of credit risk and made with just a phone call or one email (with documentation to follow later). Therefore, in some cases, an unconditional guarantee from the municipality to the bank is requested to obtain a loan free of credit risk. This allows borrowing against the lowest possible prices and without the extensive annual bank demands. Municipalities carefully consider whether or not to provide a guarantee to support public services. In the case of default of payments by the debtor, failure to satisfy the terms of a loan obligation or failure to pay back a loan, the due amounts become immediately payable by the guarantor, in this case, the municipality. However, in practice, negotiations immediately commence to avoid such a situation.

3.4.3 Borrowing through intermunicipal organisations

If intermunicipal organisations are assigned the status of a legal entity, they can borrow on their own behalf instead of through participating municipalities. This shifts municipal debt levels to these new organisations. It is not a matter of course, however, that intermunicipal organisations can borrow against the same conditions as the participating municipalities. In

the case of public legal entities,[16] they are only financed free of credit risk if their articles of association comply with the bank's requirements, which in turn must be in line with the provisions of the Dutch Central Bank.[17] The predefined triggers to avoid a situation of default, as regulated for municipalities in Article 12, are not applicable to intermunicipal organisations. When applying for risk-free credit, statutory provisions should stipulate that in the case of default, the participating municipalities are held fully accountable. If this is not the case, lending is assessed with credit risk. Similarly to municipalities, intermunicipal organisations must present a balanced budget and, after approval, they are free to borrow within the legal boundaries to execute their budget. In the case of budgetary shortage or default, the participating municipalities will contribute.

This is somewhat different in the case of a private legal entity (governed by private law). When situations are assessed to have credit risk, the distance between the participating municipalities and the entity is perceived to be larger than in the case of a public legal entity. One of the main reasons for a municipality being involved in creating a private entity is to remove the assessment of financial risk. Participating municipalities do not agree beforehand to be fully accountable for any budgetary shortage or default. Private legal entities can borrow from the sector banks if public involvement is assessed as sufficient; however, they must comply with bank demands and borrow with credit-risk surcharges. To facilitate borrowing issues, an unconditional municipal guarantee might resolve problems, but municipalities are not eager to enter into new financial risks. Dilemmas can arise, particularly if political and social welfare costs are coupled with default. For example, should the construction of a school or a bridge be in default before completion of the project, the municipalities involved may be

[16] Governed by the Common Regulations Act (Wet gemeenschappelijke regelingen).

[17] Art. 2.8, Regulation of Capital Requirements for Credit Risk, and its explanatory notes, annex 2B. Replaced by CRD IV in 2014.

forced to finish and finance the project themselves anyway.

3.4.4 The annual treasury plan

To facilitate treasury decisions, it is common practice for municipalities to draw up a treasury plan, which may come in many forms. The core of this plan is to delineate how the municipality will comply in a practical way to the financial requirements throughout the year.

The loan portfolio and developments are clarified as are specifications of new loans to be arranged, as well as providing information concerning guarantees and municipal lending issues. Information related to financial reports, such as interest levels, charges and payments, is also included, as well as how the municipality will deal with new financial regulations and, in addition, a schedule of periodic meetings and the topics to be addressed. In a municipal environment it is important to pay attention to the calendar of resolutions by the municipal executive and the council and to address the multiple deadlines of policy notes to ensure the right procedures are followed and things are done in a timely manner.

In addition to the treasury plan, municipalities are obliged to publish financial ratios conforming to official calculation methods, and these must be used in the budget and the financial statements as well. The following ratios are compulsory: equity to total assets ratio (solvency), net debt to budget ratio, land assets to budget ratio, and local tax burden to the national average ratio. These ratios are developed and implemented to help the council manage and control financial developments.

3.5 The process of municipal borrowing

Municipal borrowing is prepared and executed by the treasurer or the treasury committee. In most cases, an annual treasury plan is submitted by the treasury to the municipal executive, with relevant financial developments and transactions for the coming year. After approval, the treasury is free to operate within this plan. This significantly facilitates operational procedures.

The treasury is required by those responsible for the budget to provide the money in time to make the necessary payments. The treasury is under pressure to ensure the right amount of money is available at the right time, the right place and at the best price. To optimise the process of borrowing, a liquidity plan provides information on which to base financial decisions and transactions. A liquidity plan summarises the expected cash inflows and outflows on a daily, weekly, monthly and yearly basis. Refinancing existing debt makes up a substantial share of treasury decisions. Furthermore, an analysis of the capital market can help sharpen treasury decisions when negotiating with the bank.

In line with the municipal treasury regulations, various offers from banks are usually requested by the municipal treasury, at the same time in the same format, by email or by phone, and are then compared. Each bank's quote will be valid for some time, depending on the volatility of the market and the competitiveness of the bid. This time slot can differ from a couple of minutes to a couple of hours and sometimes even days.

Accepting an offer is done by email or phone and confirmed by the bank, whose back and mid offices are responsible for the registration of the transaction in the administrative system and

the required flow of documents. If a rebound is agreed upon, the offering bank will be given a second chance to improve its offer if needed. Demanding customised borrowing solutions makes it more difficult for municipalities to work with simple formats to compare the different offers of the banks, and they also provide opportunities for an additional commercial margin for the bank.

The loan agreement comes into force when a legally effective signing of the agreement letter and term sheet is completed. If not explicitly agreed upon elsewhere, the disbursement of the loan will only be effective after the following documents have been received within 14 days:

- The legally effective initialled and signed agreement, with the name and the position of the signatory.
- A copy of the decision for arranging the loan by the municipal executive, or a duly authorised representative of the municipal executive, accompanied by the mandate decision. The latter might be stipulated in the municipal treasury regulations.
  A copy of a valid identity document of the signatory.

In addition, all requested information must be disclosed and the general terms and agreements complied with.

Two authorised bank employees from the bank's client desk co-sign the agreement and check the authenticity of the signatures. For practical reasons, it is common practice that the official documents follow after the loan has been disbursed: indeed, a municipal loan may be disbursed on the same date as agreed upon by phone (recorded) or email. The client desk will note if unusual transactions are made and will perform additional checks when needed. Art.

203 of book 6 of the Dutch civil code enables the recollection of money in the case of non-performance, that is, not receiving the legally effective signed agreement letter and term sheet. To prevent abuse, loans are only disbursed to the assigned current accounts at the bank. From that moment, the municipal treasury can make payments with the usual additional safety checks.

3.6 Quantitative description of municipal borrowing

In this section, we will present some key figures concerning municipal borrowing in the Netherlands.

3.6.1 Total debt of municipalities

Research on municipal debt levels should not focus solely on total debt. A distinction should be made between the varieties of debt forms. There are essential differences between long-term debts, short-term debts, accounts payable and accrued liabilities. Accounts payable may total up to 5%, while accrued liabilities (including interest payable in the next year) may add up to 10% of total debt.

Total municipal debt in 2014 in the Netherlands was EUR 52 billion, comprising EUR 36 billion long-term, EUR 8.3 billion short-term, EUR 3.3 billion accounts payable and EUR 4.4 billion accrued liabilities.[18] In 2014, total municipal expenditures amounted to EUR 50.7 billion, almost equal to total debt.

The market share of BNG Bank is estimated at 70%.[19]

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[18] Own calculation based on internal data from BNG Bank and Statistics Netherlands.

[19] Annual reports of BNG Bank report high market share. Source: internal data BNG Bank.

3.6.2 The amortisation schemes chosen

Amortisation schemes influence the duration of the loan, and therefore the interest that must be paid. Municipalities use a current account or short-term loans to bridge cash imbalances for up to one year.[20] Short-term loans have no amortisation scheme, just a fixed interest rate and a final bullet payment at the end. Long-term loans are used to finance investments and to bridge the long-term liquidity gap with a maturity related to the liquidity need. In this case, standardised amortisation schemes are usually used; however, requested amortisation schemes are available. The following standardised schemes are available (all with a fixed interest rate):

1. Long-term loans where the principal is paid back at maturity (fixed or bullet).
2. Long-term loans where amortisation and interest is paid in equal instalments (annuity).
3. Long-term loans where the principal is paid back in equal instalments (linear).

The following table indicates the relative importance of the amortisation schemes used for loans made by BNG Bank.

Table 3.1 Average percentage of amortisation schemes used (research period n = 5464. Source: internal data BNG Bank)

Amortisation	1997-2013	2009-2013
Annuity	7.3%	3.8%
Bullet	21.8%	36.7%
Linear	70.8%	59.5%

Here, we note a shift towards bullet loans. A possible explanation for this phenomenon could be a shift from project-based finance towards balance-sheet finance. In the latter case, a loan

[20] According to the definition in the Finance Act, short-term loans have a contracted fixed interest period shorter than one year.

is not linked to an asset but to overall liquidity needs. Balance-sheet finance is considered to be more efficient because all available and foreseeable liquidity is taken into account. Another possible explanation for the shift towards bullet loans is that less liquidity is needed to finance amortisations during maturity.

Linear loans are still the most common loan form for municipalities. Linear loans are the primary source due to the advantages of spreading amortisations over time and limiting interest risk when the amortisations have to be refinanced. Linear loans deal with uncertainty in liquidity plans and offer opportunities to take advantage of lower interest rates in the future. Annuity schemes are typically asset-related and are no longer common.
Analysing the maturity of the loan portfolios of up to one year and beyond, we find that Dutch municipalities are mainly financed by long-term loans (beyond one year), while short-term loans, including the current account, add up to 11% (Table 3.2). As a result of this, interest shocks would have only a limited effect on the budgets of municipalities.

Table 3.2 Average percentage of types of loans/credit used, measured according to total loan sum at year end (2009-2013). Source: internal data, BNG Bank.

Types of loans/credit	**Percentage of total debt**
Long	89%
Short	6%
Float[21]	1%
Current account	4%

[21] Loan amount and interest rate can change during maturity.

Appendix: Provisions of general terms and conditions of credit

General Terms and Conditions of Credit (*Algemene Kredietvoorwaarden*)

As municipal borrowing is provided by sector bank lending, the General Terms and Conditions of Credit of each respective bank are in force. These terms and conditions cover, among other topics, definitions, the jurisdiction and the fundamentals of the agreement. The purpose of the general terms is to clarify how the agreement should be dealt with in all circumstances. They protect the bank from liability, unless serious misconduct or fraud can be proven. As such, they are an essential part of reducing credit risk for the bank and enhance the credit quality of municipalities. These terms and conditions are applicable to every bank loan made to a municipality.[22] Some of the provisions that can be linked directly to the quality and price of credit are mentioned below.

The following provisions are included in the general terms and conditions for credit agreements.

- The bank is entitled to transfer loans to a third party. This enhances liquidity in the secondary market and, therefore, the price of credit.
- To avoid small transactions with relatively high transaction costs, loan transactions have set minimums (i.e. cash loans a minimum of EUR 1 million, and changes to the amount are set at a minimum of EUR 100,000). The bank may ignore this provision for commercial reasons.
- The bank is entitled to vary the timeslot and the validity of an offer according to the market situation. With volatile markets, the timeslot is short. The smaller the spreads, the shorter the timeslot. This means requesting a long timeslot because authorisation procedures require larger spreads.
- The calculation methods and the timing of interest and instalment payments due are covered by the provisions.
- In the case of a loan with the possibility of re-pricing the interest rate during maturity, the borrower must present any substantially lower offer, if changing bank. In such cases, the bank may make a final offer.
- Unless previously agreed upon, early repayment of the loan is not permitted. Should this occur, a fee is due to the bank equal to the present value of the early repayment plus all applicable costs.

[22] The general terms and conditions of BNG Bank are written in Dutch and not available in English (www.bngbank.nl). For international transactions, other terms and conditions are applicable.

- A penalty is charged if payments of interest and instalments are not in line with the agreement.
- Unless previously agreed upon, the bank does not charge any costs or fees as a result of the credit agreement. Any juridical costs incurred when executing the agreement are to be paid by the client.
- As a result of ensuring all laws and regulations have been complied with, additional costs may be charged to the client during the agreement period.
- The client provides all necessary information to the bank for an adequate assessment of the situation.
- The provision 'immediate payability or termination of the credit facility' is common in most general terms and conditions. Any conditions that differ from the situation when the agreement was made, or that are not in line with the agreement, may be a reason for termination. Any costs in connection to this are to be paid by the client.

4 Bailout clauses and borrowing costs[23]

The bulk of capital provided to Dutch housing corporations is explicitly guaranteed by a bailout clause. Using a dataset with loans provided by the largest Dutch public sector bank (BNG Bank), we find substantial evidence that this bailout clause has reduced interest rates by about 72 basis points. The annual benefits of reduced interest costs have outweighed the costs of default in the past (1990-2014). We also find that the interest rates for guaranteed loans are insensitive to the financial position of corporations. We therefore surmise that the bank relied on the bailout clause. Finally, the bailout clause for corporations (which guarantees individual loans) and the one for municipalities (which entirely protects municipalities from defaulting) lead to a similar reduction in interest rates.

4.1 Introduction

The Dutch (semi-)public sector is well-known for its explicit bailout clauses (or guarantees). The unique Dutch setting is explained in more detail in Chapter 2 and Chapter 3. The presence of a bailout clause means that if an organisation would run into trouble, it will receive financial assistance from its counterparts or from the government. The idea behind this is to communicate to creditors that providing capital entails no risk (funds provided and interest payments due are guaranteed). This should reduce interest rates on loans so that more resources can be devoted to the public goal. A major advantage of a guarantee (in contrast to for example a subsidy) is that it does not have to cost society any money if it proves to be

[23] This chapter is based on Veenstra, J., & van Ommeren, B.J (2017). Bailout Clauses and the Price of Credit: The Dutch Experience for Housing Corporations. *De Economist* , 165(3), 295-320.

sustainable.

In many countries, however, bailouts are explicitly ruled out by legislation. This is to prevent 'moral hazard'; the danger that debtors become less rigorous in controlling their finances knowing that they would be assisted should problems arise (Rodden, 2006). Debtors thus face a 'soft budget constraint' (Kornai, Maskin, & Roland, 2003), which is seen to encourage them to behave irresponsibly. Thus in the literature, the dominant view is that an explicit no-bailout clause must be formulated in order to emphatically state to institutions that they will not be rescued (Allers, 2015). In practice, however, it is difficult to credibly enforce such a clause. Actual bankruptcy of subnational governments or (semi-)public organisations could entail high welfare and political costs (Goodspeed, 2002; Plekhanov & Singh, 2006). Indeed, there are numerous examples of bailouts actually occurring despite the existence of a no-bailout clause (Heppke-Falk & Wolff, 2008; Rodden, 2006). However, in the Dutch public sector explicit and regulated guarantees exist for, e.g., housing corporations, health care institutions and municipalities. In the case of municipalities, Allers (2015) notes that the bailout clause has not led to excessive malpractice. Therefore, he argues, there is sufficient reason to challenge the traditional view that bailouts must be ruled out. It may even be the case that the benefits of a bailout clause (reduced interest payments) outweigh the costs (defaults on loans and/or increased inefficiencies). This paper attempts to measure the effect of a bailout clause on interest rates by focusing on loans made to (housing) corporations.

Firstly, by comparing a set of guaranteed and unguaranteed corporation loans, we investigate whether the bailout clause succeeds in lowering interest rates. Secondly, we study whether differences in interest rates can be explained by corporation characteristics such as indebtedness; under a credible bailout clause all corporations should pay the same interest rate on similar loans, regardless of their financial position. Thirdly, we investigate whether the design of the bailout clause is relevant for interest payments by comparing the guarantee

system of corporations (which secures individual loans) with that of municipalities (whose entire financial position is secured).

Existing literature mostly focuses on no-bailout or implicit bailout clauses (for an overview, see van Hecke (2012). To our knowledge, this paper is the first study investigating the effect of an explicit bailout clause. We exploit a unique micro-level dataset of loans made to housing corporations that distinguishes both guaranteed and unguaranteed loans. This enables us to investigate whether structural differences exist between the two groups of loans.
As another addition to the existing literature, we provide new empirical evidence of the extent to which these guarantees help to lower borrowing costs. For society, the effect of the guarantee system on borrowing costs for housing corporations is highly relevant. If these borrowing costs are reduced, this will leave additional financial room for social housing. In addition, the guarantee system for housing corporations is compared with that for municipalities. The results will show whether the guarantee system for municipalities has the same effect on borrowing costs, thus potentially leaving additional financial room for public facilities.
The rest of this paper is set up as follows. Section 4.2 describes the institutional background of housing corporations, paying special attention to the bailout agreements. Section 4.3 briefly outlines the theory on interest rate determination and provides hypotheses. In section 4.4 we present the research set-up and in section 4.5 the data. Section 4.6 delivers our main results. The robustness of our findings is tested in a sensitivity analysis presented in section 4.7 Section 4.8 offers our conclusions.

4.2 Institutional Background

4.2.1 Housing Corporations

The social housing market in the Netherlands is dominated by housing corporations; privately governed institutions executing a set of public tasks. In 2014, the 363 Dutch housing corporations possessed a total of around 2.4 million dwellings, which equals about 30 percent of the total housing stock (source: *Statistics Netherlands*). From an international viewpoint, these figures are remarkably large (Whitehead & Scanlon, 2007). The total value of debt in the sector amounted to more than 90 billion euro (source: *CorpoData*). Interest payments were approximately 4 billion euro in 2014 (an average of about 1,700 euro per dwelling). About half of the corporations' external funding is obtained from BNG Bank, the largest public sector bank in the Netherlands. Corporations can also fund themselves through NWB Bank, the second largest public sector bank or, alternatively, through commercial banks. Public sector banks benefit from high credit ratings and therefore low funding costs. This is reinforced by the likelihood of government support as a result of their public policy mandate (Birry, Hauville, Roy, & Ashworth, 2013). In the literature, this support could be assessed as an implicit subsidy causing market distortions. Those who benefit from the implicit subsidy have a competitive advantage over those that do not (Noss & Sowerbutts, 2012).

Until the end of the 20th century, the Dutch central government actively intervened in the social housing market by providing, for example, project subsidies. Over the past decades however, the ties between government and corporations have loosened, both financially and operationally. In the 1990s subsidies were eliminated. To compensate, the central government relieved corporations of a substantial part of their debt. The other major advantage that housing corporations enjoy is a system of loan guarantees.

4.2.2 The guarantee scheme for the social housing sector

A credible no-bailout clause serves to make creditors aware of the risks of a loan (i.e., the probability of default). Higher credit risk translates into higher interest rates. As debtors aim for the lowest possible interest rate, they have an incentive to closely manage their financial positioning. In the Dutch case, where bailouts are explicitly regulated, this 'market discipline' is absent or at least distorted (Lemmen, 1999; Schuknecht, Hagen, & Wolswijk, 2009). However, a form of 'rule discipline' does exist in the Netherlands, in the form of legislation and policies that constrain institutions' borrowing capacity in practice. The Guarantee Fund Social Housing (*Waarborgfonds Sociale Woningbouw*, WSW) assesses each corporation's financial position in order to determine whether or not it may borrow under the guarantee of the bailout clause (WSW 2009). These WSW-guarantees are thus not unconditional. If the WSW considers creditworthiness insufficient and, if there are no visible signs of improvement, it may refuse the granting of guarantees.

Dutch housing corporations access two main types of loans; guaranteed and unguaranteed. Only capital used for investing in the service of general economic interest (*Diensten van Algemeen Economisch Belang*, DAEB), such as building dwellings for low-income households, can be guaranteed. In contrast, loans financing, for example, commercial activities, are not guaranteed. Also, short-term loans (defined here as having a maturity of less than 2 years) are never guaranteed.

The guarantee scheme consists of three levels. First, if the resources of a housing corporation are insufficient to resolve its own problems, 'reorganisation subsidies' may be provided by the financial supervisor, the Central Public Housing Fund (*Centraal Fonds Volkshuisvesting*, CFV).[24] These subsidies are paid for by implementing a 'one-off tax' on other housing

[24] Since July 1, 2015, the CFV has been replaced by the Authority Housing Corporations (*Autoriteit woningcorporaties*, Aw) and decisions concerning reorganisation subsidies are being made by the WSW since then.

corporations.

At the second level, creditors can appeal to the guarantee funds of the WSW if the reorganisation subsidies are insufficient. The WSW has a financial reserve that can be called upon and if this reserve drops below a certain threshold, it can increase its resources by enforcing a contribution from all housing corporations. This contribution is calculated on the basis of outstanding guaranteed debt of each corporation. At the end of 2014, the sum total of WSW-guarantees was approximately 3.5 billion euro (source: Ministry of the Interior and Kingdom Relations 2016).

In essence, these first two levels of the guarantee scheme boil down to mutual support among corporations. There is a further third level, however: if necessary, the government will step in to provide interest-free loans to the WSW. The burden of debt thus entailed is then equally divided between central government and municipalities.

De Jong (2013) concludes that the complexity of this scheme provides weak incentives for creditors to monitor corporations, and will lead to excessive risk for the sector as a whole. Indeed, a few (large) corporations did get into severe financial distress in the past decades. However, despite these incidents, until now only the first level of the guarantee scheme has ever been accessed. Thus, so far, the bailout clause is proving to be sustainable. From 31 December, 1990 until 2014, just 21 corporations received reorganisation subsidies to a total of about 1.5 billion euro (in euros of 2014) (source: CFV 2015, own calculations). Therefore, if interest savings are large enough, it is not unimaginable that the benefits of the bailout clause have outweighed the costs.

4.3 Theory and Hypotheses

4.3.1 Interest rate setting

Suppose a party (e.g., a housing corporation) borrows from a bank. If the bank is certain that

the loan will be recovered, it will be satisfied with the risk-free interest rate. Suppose now, that the creditor faces a positive probability $P(X_j)$ that debtor j will default on the loan, where X_j is a vector of variables affecting this probability. Assuming risk-neutrality, the bank is only willing to make the loan if the expected return ($R_{i,j}^{exp}$) at least equals the risk-free return (R^f), or: $\mathrm{P(X_j)}$

$$R_{i,j}^{exp} = \left(1 - P(X_j)\right) R_{i,j} + \tau_{i,j} P(X_j) R_{i,j} - P(X_j) c \geq R^f \quad (1)$$

$$i = 1,2,\dots,N_j, j = 1,2,\dots,J$$

where $R_{i,j}$ is the rate of return agreed upon by the creditor and debtor j ($j = 1,2,\dots,J$) on loan i ($i = 1,2,\dots,N_j$). Note that $R_{i,j} = 1 + r_{i,j}$, where $r_{i,j}$ is the interest rate of the loan. Further, $\tau_{i,j}$ is the proportion of the return that the creditor recovers in case of default, following Heppke-Falk & Wolff (2008). We extend Heppke-Falk & Wolff's (2008) model by including a variable c that denotes the extra costs that would not be recovered in case of default, such as legal costs or delays in payment (Schultz & Wolff, 2009).[25]

Solving (1) for $R_{i,j}$ yields:

$$R_{i,j} \geq \frac{R^f + P(X_j) c}{1 - (1 - \tau_{i,j}) P(X_j)} \quad (2)$$

It can be seen from Equation (2) that the required rate of return is increasing in $P(X_j)$ and c, and decreasing in $\tau_{i,j}$.

Two benchmark scenarios emerge from Equation (2) resembling the housing corporations' situation. If there is no bailout clause ($\tau_{i,j} = 0$), as would be the case for unguaranteed

[25] To be more complete, the total extra costs may be both fixed (legal costs) and/or dependent on the loan sum (payment delays). Total extra costs would then be $C = c * loan\ sum + \bar{C}$. To get the return on the initial investment, this term should be divided by the loan sum ($C/loan\ sum = c + \bar{C}/loan\ sum$). For simplicity, section 3.1 assumes that fixed costs ($\bar{C}$) are not relevant so that only c appears in Equation (1). Still, in the empirical part, the loan sum is included in the regressions.

corporation loans, the minimally required return obtains its maximum value of:

$$R_{i,j} \geq \frac{R^f + P(X_j)c}{1 - P(X_j)} \tag{3a}$$

On the other hand, if there is an explicit bailout clause that guarantees the loan ($\tau_{i,j} = 1$), the creditor may only require a premium above the risk-free rate in order to account for the non-recoverable costs, that is:

$$R_{i,j} \geq R^f + P(X_j)c \tag{3b}$$

Finally, note the inequality sign in the equations. If we assume perfect competition, the actual return rate agreed upon ($R_{i,j}$) equals the required rate of return, because if the creditor demanded a higher rate, the corporation would borrow from another bank. However, if the creditor has market power, it may obtain an extra premium (i.e., a commercial margin), which may depend on e.g., bargaining skills of both parties and the availability of alternative financing options.

In short, a positive interest spread (i.e., $R_{i,j} - R^f > 0$) may occur because: (1) the loan is not guaranteed and there is a positive probability of default; (2) non-recoverable costs are relevant; or (3) the creditor succeeds in obtaining a commercial margin.

4.3.2 Hypotheses

As noted, our dataset allows us to distinguish between guaranteed and unguaranteed (mostly short-term) corporation loans. This offers us the unique opportunity to see what a bailout clause does to interest spreads.

According to Equation (3), interest spreads are lower for guaranteed loans than for unguaranteed loans. Hypothesis 1 tests whether BNG Bank does indeed distinguish between

the two types. Several authors have posited educated guesses about the effect of the bailout clause on interest rates: see Van der Schaar (2006); Finance Ideas (2011); Hendriks (2013). Expected interest advantages lie between 0.5 and 1.5 percentage points (or 50 to 150 basis points). However, firm empirical evidence is lacking.

Hypothesis 1.

Unguaranteed loans have higher interest spreads than guaranteed loans.

For unguaranteed loans, corporation characteristics (X_j) are presumed to be relevant determinants of the interest spread (see Equation 3a). For guaranteed loans, according to Equation (3b), these characteristics are only relevant if extra non-recoverable costs (c) matter. If these costs are negligible, the interest spread may become insensitive to the risk profile of the corporation. Hypothesis 2 tests whether the relationship between corporation characteristics and interest spreads is different for guaranteed and unguaranteed loans.

Hypothesis 2.

Housing corporation characteristics do not influence the interest spread of guaranteed loans.

Van Hecke et al. (2012) provide an extensive overview of the literature on (the determinants of) interest spreads as far as local governments are concerned. The bulk of that literature concludes that higher debt leads to higher interest rates: see for example Booth et al. (2007); (Landon & Smith, 2007); Heppke-Falk & Wolff (2008). Some of the literature holds that local government budget balance is also important (Booth, Georgopoulos, & Hejazi, 2007; Schuknecht, Hagen, & Wolswijk, 2009).

Most studies focus on countries where no (explicit) bailout clause exists. However, Heppke-Falk & Wolff (2008) focus on the German case in which a bailout of a region (*Land*) might well occur. The probability of a bailout could actually be predicted by a variable that the

German law courts use in their assessments of bailouts. It appears that, indeed, the expectation of bailout payments lowers the interest rate. This suggests that investors do, in effect, take into account the possibility of a potential bailout.

Nevertheless, Heppke-Falk & Wolff (2008) find that as fiscal variables do have a significant influence on interest spreads, investors do not see regional governments as completely risk-free. This finding is not replicated by Schulz & Wolff (2009), however, who find that the effect of the debt level is only weakly significant.

Feld et al. (2013) focus on the case of Swiss cantons where there was a structural break in investors' expectations of potential bailout. In July 2003, the Swiss Federal Court officially decided that Valais canton was not obliged to bail out the municipality of Leukerbad after it came into financial trouble. Previous to this decision, Swiss law had indicated that although cantons did not have bailout obligations, they could still deviate from this ruling. This possibility apparently led to a widespread belief among investors that municipalities would be bailed out, if and when necessary. Indeed, Feld et al. (2013) find that, cantons, being relieved from any expected bailout obligations, have seen a decline in bond yields by 25 basis points since the 2003 judgment.

The Swiss case shows certain similarities with the situation of Dutch housing corporations, as both deal with two different bailout clauses. However, in the Swiss case, a distinction is made between a non-credible and a credible no-bailout clause, whereas the Dutch situation features an explicit bailout clause and an implicit no-bailout clause. Also, there was a cut-off between the two Swiss schemes in 2003, whereas in the case of Dutch corporations, both schemes coexist over the years.

In addition to financial characteristics, the scale of organisations can also be influential. Under a no-bailout clause very large organisations may be deemed 'too big to fail' meaning that for these organisations, the no-bailout clause would not be credible (Heppke-Falk & Wolff,

2008). Also, one may assume that large institutions have more financial expertise and so they would bargain more effectively.

Finally, according to Equation (3b), even in the presence of a bailout clause, interest rates may exceed risk-free rates due to non-recoverable costs. If these costs are relevant, even guaranteed loans would not be considered completely risk-free. Hypothesis 3 tests whether non-recoverable costs are of relevance, by comparing the interest spreads of housing corporation loans with those of municipality loans. The bailout clause for municipalities entirely protects them from defaulting, whereas for corporations, only individual loans are guaranteed. Thus, for municipalities the creditor is not involved in the process of recovering a loan in case of default and, therefore, there is no need to worry about non-recoverable costs. For housing corporations, on the other hand, the creditor is directly involved in the execution of the clause and, therefore, it is likely that *c* is non-zero for corporations. Therefore, housing corporations may be charged higher interest rates than municipalities.

Hypothesis 3.

The interest spreads on guaranteed housing corporation loans exceed the interest spreads on municipality loans.

4.4 Research Set-up

To test Hypotheses 1 and 2, we estimate the following regression model:

$$r_{i,j,t}^{spread} = \alpha + \beta\tau_{i,j,t} + \gamma X_{j,t} + \delta L_{i,j,t} + \theta_t + \mu_j + \varepsilon_{i,j,t} \quad (4a)$$

where $r_{i,j,t}^{spread}$ is the interest spread between a corporation loan and its risk-free reference rate. Thus:

$$r_{i,j,t}^{spread} = r_{i,j,t}^{c} - r_{i,t}^{f} \quad (4b)$$

For each observation, a reference rate is used that has the same: (1) amortisation scheme; (2) contracting date; and (3) maturity. This way, we control for factors influencing the general interest rates in the economy, such as (expected) inflation, as well as structural differences in interest as a result of differences in amortisation or maturity. Opting for a spread frees us from the problem of explicitly controlling for these factors (Küttel & Kugler, 2002). Note that we construct an interest spread in absolute, rather than relative terms. This is done because BNG Bank maintains that credit assessments lead to an additional spread in percentage points for risky loans, regardless of whether the risk-free interest rates in the economy are high or low.[26] In our sensitivity analysis (section 4.7), we use a relative spread as well.

Further, $\tau_{i,j,t}$ is a bailout indicator, taking the value of 1 if the loan is guaranteed (i.e., the loan belongs to the treatment group) and 0 if not (the control group), $X_{j,t}$ is a column-vector with corporation specific characteristics, $L_{i,j,t}$ denotes a column-vector with loan characteristics, θ_t is a year dummy, μ_j is a corporation specific (fixed) effect and $\varepsilon_{i,j,t}$ is the error term. i is the loan subscript $\left(i = 1,2,3, \dots, N_j\right)$, j the corporation subscript $(j = 1,2,3, \dots, J)$ and t the time subscript.

Note that the nature of our data may frustrate the estimation of the effect of a treatment (i.e., a bailout) since the treatment and control groups are dissimilar. Indeed, all short-term loans (with a maturity less than 2 years) are unguaranteed, whereas nearly all long-term loans are guaranteed. This may make identification problematic. That is, the effect of a bailout cannot be isolated completely, since the bailout indicator correlates with loan type (see section 4.5.1)

[26] Source: interview with the Chair of the Credit Committee of BNG Bank prof. dr. J.J.A. Leenaars 2002-2015.

and maturity. If loan type or maturity is a relevant determinant of interest spreads, it is hard to isolate the effect of the bailout. Thus, the question is: to what extent is the interest spread influenced by the term structure and to what extent by the bailout clause? To deal with this, we first of all note that in principle, loan type and maturity should have no effect on interest spreads since our reference rates take these factors into account (see section 4.5.2).

For completeness however, we will investigate the term structure of the interest spreads by means of regression discontinuity design (Thistlethwaite & Campbell, 1960; Lee & Lemieuxa, 2010). The idea behind this is that the relationship between maturity and interest spread has a discontinuity at a maturity of 2 years (because beyond this threshold, we deal with guaranteed loans). That is, at a maturity of 2 years or longer, we expect a sharp fall in interest spreads.

Additionally, note that there are also 3 unguaranteed bullet loans (11 when including inter- and extrapolation; see section 4.7). Although this is a small number, for these loans, the effect of the bailout can be isolated.

Note also that we deal with clustered data, i.e., the data on individual loans is regressed on $X_{j,t}$, which are variables measured at a higher (housing corporation) level (Moulton, 1990). We thus have J clusters with N_j observations. This could be a reason to cluster the standard errors at the level of housing corporations. However, because the clusters are unbalanced, this may lead to a downward bias in cluster robust standard errors (Rogers, 1993; Nichols & Schaffer, 2007, September). We use clustered standard errors in our main results and non-clustered errors in the sensitivity analysis (see section 4.7).

Finally, to test Hypothesis 3, we estimate:

$$r_{i,j,t}^{spread} = \alpha + \delta L_{i,j,t} + \varphi Corporation\ dummy_{i,j,t} + \theta_t + \varepsilon_{i,j,t} \quad (5)$$

where r^{spread} is defined as in Equation (4b), with the only difference that we do not only consider housing corporation loans (r^c) but municipality loans (r^m) as well. According to

Hypothesis 3, we expect $\varphi > 0$.

4.5 Data

4.5.1 Data sources

We have obtained micro-data on several financial products that BNG Bank provided to housing corporations between 1997 and 2013. We use BNG Bank data and not market rates because we are interested in the interest rates that they actually pay. This data is not publicly available. To compare equivalent loans, we use the amortisation scheme and maturity and not the duration of the loan. This is because our reference rates are based on amortisation scheme and maturity and not on duration. We focus on four categories of products with a fixed interest rate and an amortisation scheme in line with available reference interest rates:

1. Short-term loans (maturity less than 2 years), where the principal is paid back at maturity.
2. Long-term loans where the principal is paid back at maturity (fixed or bullet).
3. Long-term loans where amortisation and interest is paid in equal instalments (annuity).
4. Long-term loans where the principal is paid back in equal instalments (linear).

These loan categories comprise 3,440 loans (6,835 when including inter- and extrapolation) and encompass 87 percent of the total loan sum of housing corporations borrowed from BNG Bank over our research period. Accurate reference rates are not currently available for other loan types. As noted, nearly all long-term loans (about 99.5 percent) are guaranteed. Short-term loans on the other hand are, by definition, unguaranteed. In principle, the dataset comprises loans from 1997 until 2013, but for short-term loans there are no entries previous to 2008 as BNG Bank's internal system only maintains expired entries for limited periods. Also, corporation specific variables are available for 2001-2012 (annual data), obtained through

CorpoData; the database of the CFV. This means that for Hypotheses 1 and 2, we cannot use all loans in the dataset. Finally, we have a similar data set with 4,207 municipality loans (5,514 when including inter- and extrapolation).[27]

4.5.2 Reference interest rates

We have linked every housing corporation loan to a reference interest rate given by BNG Bank. Before the start of every business day, the bank builds a 'pricing yield curve' by first connecting the funding interest rates of different maturities, and then adding surcharges for profit and costs (which may depend on loan sum and maturity), a liquidity premium if applicable, and a surcharge for cost of capital ('usage of balance sheet').[28] The lending yields represent 'norm prices' for risk-free lending which we use as our reference rates. The risk-free reference rates are published by BNG Bank on a daily basis to provide an indication to debtors about actual interest rate levels.[29]

However, for very short-term borrowing (maturity up to one month), the published reference rates are not meant for actual lending but fixed at a much higher level to discourage debtors to make use of these loans. Very short-term borrowing is labour intensive and hardly profitable, so BNG Bank prefers that clients choose for a current account credit (which works automatically). In this case, actual lending is done at the Euribor level rather than at the published rate.[30] Therefore, we use the Euribor rate as a reference for very short-term loans. In our sensitivity analysis (section 4.7), we repeat the analysis while removing these loans. Reference rates are available on a daily basis but not for all maturities. More specifically, we

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[27] Note that we exclude short-term municipality loans, since it does not make sense to compare these with short-term corporation loans, since the latter are unguaranteed.

[28] The BNG reference rates comprise all relevant components, including liquidity premiums if applicable. These liquidity premiums are not applicable to short-term loans, because the money market didn't ask for.

[29] Note that these rates are only available for clients of BNG Bank.

[30] Source: head of the Treasury department/client desk of BNG Bank, R, Boltong 1996-present.

have reference rates for short-term loans with 1,2,3,6 and 12-month maturity, for bullet loans with 5 and 10-year maturity, for annuity loans with 10, 15, 20 and 25-year maturity and for linear loans with 5, 10, 15, 20 and 25-year maturity. For other maturities, (linear) inter- and extrapolation could be used to obtain references. Because we have no reason to believe that the true yield curve is linear, this may lead to imprecise estimates.[31] Therefore, in our main results we have excluded inter- and extrapolation. In the sensitivity analysis, we have included these observations (see section 4.7).

Note that reference rates cannot precisely control for all loan characteristics, especially (1) the difference between the contracting and starting date of a loan and (2) the loan sum. Therefore, these characteristics are included in the regression. For completeness, we also include the maturity of the loan.[32]

The reference rates are all based on relatively small loans (with loan sums up to 2.5 million euros). Because banking costs of a loan agreement are fixed to a large extent, a higher premium is demanded for small loans to cover costs. Therefore, the reference rates are relatively high and may therefore be considered to be upper estimates.[33]

4.5.3 Independent variables

A brief description of the independent variables ($X_{i,j}$, $L_{i,j}$ and $\tau_{i,j}$) is given below.

- Variables at housing corporation level (measured per dwelling):
    - *Company value* is the net present value of future revenues and costs, estimated by the corporations themselves.

[31] For example, if the true yield curve is concave, this would mean that we underestimate reference rates.

[32] Some loans have a fixed interest period that is shorter than the total maturity of the loan. In this case, the reference rate is based on this fixed interest period, since after that period, the interest rate may change. In the regressions however, we include the total maturity of the loan as a potential explanatory variable. Replacing this by the interest fixed period does not change results (details not shown).

[33] BNG Bank does this to create a margin of safety in case interest rates would increase during the day. Source: interview with the manager of the client desk of BNG Bank, R Boltong 1996-present.

- *Long-term debt* gives the size of long-term debt.
- *Equity* is a refined measure of equity which takes into account future prospects of the corporation (CFV 2012). Equity is important for corporations as the financial supervisor uses this figure to judge corporation performance.
- *Expected equity in t+5* gives the level of equity that the corporation expects to have in 5 years from the current year.
- *Net cash flow* gives the net cash flows resulting from operational activities.
- The number of *dwellings* is an indicator of the scale level.

- Variables at individual loan level:
  - *Rating BNG* measures the rating score that BNG Bank assigns to the riskiness of the loan. For unguaranteed loans, BNG Bank itself monitors not only the riskiness of the corporation, but also that of the specific project being financed. This variable may therefore provide additional information on top of corporation characteristics. Note that this variable is only available for unguaranteed loans.
  - *Maturity* is the number of years in which the loan is due.
  - *Loan sum* is the amount of money borrowed (the principle).
  - *Delay* indicates the difference (in days) between the contracting and starting day (money transfer) of the loan arrangement. As the interest rate of immediate borrowing is higher than the return on a deposit for the delay period, this loss of interest is covered by an additional spread on the borrowing rate.
  - *Guaranteed* is a dummy variable that equals 0 if the loan is unguaranteed and 1 if the loan is guaranteed.

Table 1 gives descriptive statistics and correlations concerning the interest spreads and the independent variables.

Table 1. Descriptive statistics and correlations.

	N (excl. inter- and extrapolation)	N (incl. inter- and extrapolation)	Mean	Standard deviation	Minimum	Maximum
Corporations						
Interest spread (all loans)	3,434	6,835	0.21	0.30	-1.61	3.92
Interest spread (guaranteed loans)	2,102	5,489	0.07	0.19	-1.61	1.55
Interest spread (unguaranteed loans)	1,332	1,346	0.44	0.30	-0.24	3.92
Company value per dwelling (in 1,000 euros)	2,791	5,587	42.16	13.39	5.85	144.49
Long-term debt per dwelling (in 1,000 euros)	2,791	5,587	32.58	17.45	5.21	179.42
Equity per dwelling (at time *t*) (in 1,000 euros)	2,791	5,587	10.76	6.46	-54.14	88.88
Expected equity per dwelling (at time *t+5*) per dwelling (in 1,000 euros)	2,791	5,587	11.04	6.35	-15.57	72.05
Net cash flow per dwelling (in 1,000 euros)	2,791	5,587	0.91	0.99	-4.62	18.19
Dwellings	2,791	5,587	16,525	17,657	91	81,376
Loan sum (in 1,000 euros)	2,791	5,587	9,434	13,174	39	150,000
Rating BNG (only relevant for unguaranteed loans)	1,260	1,260	8	2	6	19
Delay (days)	2,791	5,587	137	220	0	2,378
Maturity (years)	2,791	5,587	13	11	0	50
Guaranteed (dummy)	2,791	5,587	0.80	0.40	0	1
Municipalities						
Interest spread (all loans)	4,207	5,514	0.00	0.20	-0.54	1.84
Loan sum (in 1,000 euros)	4,207	5,514	5,654	7,121	6.6	130,000
Delay (days)	4,207	5,514	70	223	0	2,193
Maturity (years)	4,207	5,514	16	7	4.5	50

The units of observation are individual loans.
Calculations are based upon the data exclusive of inter- and extrapolated loans.

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) Interest Spread	1											
(2) Company Value per dwelling	0,0335	1										
(3) Long-term debt per dwelling	0,0682	0,8392	1									
(4) Equity per dwelling (at time t)	0,1202	0,2401	0,234	1								
(5) Expected Equity per dwelling (at time t+5)	0,1428	0,2438	0,302	0,7467	1							
(6) Net cash flow per dwelling	-0,0423	0,1022	-0,0285	0,1883	0,156	1						
(7) Dwellings	0,0958	0,0808	0,1656	0,031	0,1296	-0,0583	1					
(8) Loan sum (in 1000 euros)	0,1345	0,0422	0,143	0,0637	0,1073	-0,169	0,4099	1				
(9) Rating BNG (unguaranteed loans)	0,2518	0,1048	0,2359	0,0838	0,2241	-0,1881	0,5552	0,5704	1			
(10) Delay (days)	0,1669	-0,043	-0,0835	-0,0208	-0,0763	0,0816	-0,2228	-0,1545	-0,3186	1		
(11) Maturity (years)	-0,0164	-0,0277	-0,0771	-0,0019	-0,0745	0,0762	-0,334	-0,2708	-0,5796	0,3562	1	
(12) Gauranteed (dummy)	-0,2528	-0,1258	-0,2255	-0,1211	-0,231	0,1424	-0,5768	-0,5489	-0,9743	0,3269	0,5952	1

Amounts in 1000 euros

4.5.4 Linking housing corporation data with loan data

Housing corporation specific variables are given on a yearly basis – they reveal the situation of the corporation at the end of a year. Data on corporation loans give information on the date

of the loans. The question of how to combine yearly and daily data is somewhat arbitrary. According to BNG Bank, several sources are used to obtain the most recent information about the housing corporation.[34] For our main results, we therefore assume that the bank has the most up-to-date information. To check for robustness, we have repeated our analysis under the assumption that it takes a year to obtain this data, which would be the case should the bank rely solely on annual reports (see the sensitivity analysis, section 4.7). Thus, we describe two scenarios:

- In the **standard scenario**, we link all loans in the first half of year *t* to corporation characteristics in year *t-1*. Loans in the second half of year *t* are linked to year *t* itself.
- In the **lagged scenario**, we link all loans in the first half of year *t* to corporation characteristics in year *t-2*. Loans in the second half of year *t* are linked to year *t-1*.

4.6 Results

4.6.1 Hypothesis 1

Table 2 presents the estimated results of Equation (4). Regression (1) gives the results for all loans, and Regressions (2)-(6) give the results per loan type.

Regression (1) shows that the coefficient on *guaranteed* is negative and highly significant which confirms Hypothesis 1. The coefficient is -0.7232, which means that the bailout clause reduces the interest spread by around 72 basis points.

Note that in Regression (1), we have not included dummy variables for loan type (i.e., type of amortisation). This is because the variable *'short-term loan'* suffers from multicollinearity with the variable *guaranteed*. Indeed, as noted, most unguaranteed loans are short-term loans. Therefore, we cannot completely isolate the effect of the bailout clause. It could be argued

[34] Source: interview with the specialist for the social housing sector of BNG Bank, R Goorden 2008-present.

that the difference in spreads between guaranteed and unguaranteed loans is (partly) due to the difference in loan type.

Table 2. Regression results of interest spreads.

	(1)[a] All loans	(2) Bullet loans	(3) Annuity loans	(4) Linear loans	(5) Short-term loans	(6)[a] Bullet & Short-term loans
Corporation characteristics						
Company value	-0.0001	0.0026*	-0.0012	-0.0001	-0.0459***	0.0009
	(-0.0474)	(1.7168)	(-0.7719)	(-0.0223)	(-6.3750)	(0.2053)
Long-term debt	0.0007	-0.0018	-0.0019	-0.0015	0.0181**	0.0028
	(0.3492)	(-1.0589)	(-0.5862)	(-0.6171)	(2.7593)	(0.5406)
Equity	0.0048	0.0002	0.0032	-0.0025	0.0584***	0.0102**
	(1.4273)	(0.0595)	(0.9037)	(-0.2853)	(11.1315)	(2.0244)
Equity t+5	-0.0031	0.0021	0.0018	0.0050	-0.0418***	-0.0064*
	(-1.3635)	(1.1604)	(1.1661)	(0.8045)	(-3.5570)	(-1.7412)
Net cash flow	-0.0083	0.0006	0.0005	0.0003	0.0573	0.0044
	(-1.0340)	(0.0777)	(0.0465)	(0.0186)	(0.8098)	(0.3926)
Dwellings	-0.0013	0.0002	-0.0002	0.0050	0.0282***	-0.0024
	(-0.5253)	(0.0920)	(-0.1738)	(0.1415)	(3.9619)	(-0.6665)
Loan characteristics						
Guaranteed	-0.7232***	-0.8617***				-0.8164***
	(-7.9222)	(-6.9036)				(-7.4092)
Rating BNG					0.1391**	
					(2.1057)	
Loan sum	-0.0050**	-0.0067**	-0.0007	-0.0049	-0.0036	-0.0032
	(-2.3263)	(-2.2794)	(-0.3902)	(-1.5816)	(-1.3735)	(-1.5551)
Loan sum^2	0.0001	0.0002	-0.0000	0.0001	0.0001	0.0000
	(1.4833)	(1.5628)	(-0.5871)	(1.5126)	(1.3049)	(0.9851)
Delay (*1000)	1.0980***	1.2394***	0.8697***	1.0186***	-29.6036***	1.2957***
	(11.1424)	(11.2800)	(9.3812)	(5.1099)	(-3.0343)	(9.1981)
Delay (*1000)^2	-0.5757***	-0.7394***	-0.2114**	-0.4923**	1,306.2816*	-0.7679***
	(-4.1485)	(-4.2723)	(-2.1517)	(-2.2160)	(1.8217)	(-4.6726)
Maturity	-0.0030	-0.0011	-0.0108***	-0.0055	-1.5878	-0.0076
	(-0.7060)	(-0.2129)	(-3.5507)	(-1.0867)	(-1.3484)	(-1.3483)
Maturity^2	0.0001	-0.0000	0.0002***	0.0001	3.6256**	0.0002
	(0.7340)	(-0.0679)	(4.1552)	(0.6506)	(2.2082)	(1.2101)
Constant	0.6965***	0.5400**	-0.2155	-0.2226	1.1644***	0.5647**
	(4.2400)	(2.0647)	(-0.7908)	(-0.0916)	(3.3126)	(2.2198)
Observations	2,791	810	486	209	1,260	2,096
R-squared	0.6536	0.7735	0.8860	0.8926	0.6951	0.6752

Robust t-statistics (based upon clustered standard errors) in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Year and corporation dummies (fixed effects) included.

[a] Dummy variables denoting the type of loan and *Rating BNG* are omitted because of multicollinearity with *Guaranteed*.

The number of observations in Regression (1) does not equal the sum of Regressions (2)-(5), because *Rating BNG* is not available for all unguaranteed loans.

However, when including loan type dummies in Regression (1), we find no significant difference in interest spread between different long-term loan types (i.e., the coefficients of dummies for bullet, annuity and linear loans are insignificant; details not shown). Thus the loan type does not seem to be influential.

Additionally, note that there are also 3 unguaranteed bullet loans (11 when including inter-

and extrapolation; see section 4.7). Regression (2), dealing with bullet loans only, indicates that the interest spread is about 86 basis points higher for unguaranteed loans.

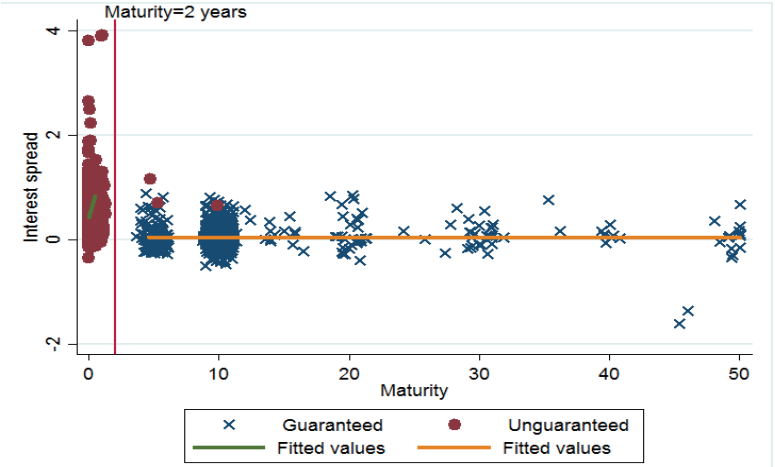
One may also argue that bullet loans and short-term loans are essentially the same (as for both loan types the principal is paid back at maturity). The only difference is in fact the difference in maturity. Regression (6) shows the results for bullet and short-term loans together. The bailout clause remains significant, and the coefficient is increased to -0.8164.

However, these regressions still fail to fully separate the effect of maturity on the interest spread (i.e. the term structure of the interest spread) from the effect of a bailout clause.[35] Although in principle, there would be no reason to expect the interest spread to change with maturity (see section 4.4), we need to ascertain this empirically. Figure 1 plots interest spreads against maturity and provides two separate linear regression lines (one for short-term loans and one for long-term loans).[36] The figure only includes short-term and (long-term) bullet loans. Cleary, interest spreads are higher for short-term (and thus unguaranteed) loans. Most importantly however, there appears to be no relationship between maturity and interest spreads for loans with a maturity of more than 2 years.

[35] Although maturity and maturity^2 are included in the regressions, this does not fully reveal the term structure of interest spreads.

[36] Note that on the horizontal axis of the figure, total maturity is given. In practice however, interest rates are linked to the fixed interest period, which may be shorter than the total maturity of the loan (see also footnote 9). Repeating the analysis for the fixed interest period instead of the total maturity leads to the same conclusions however (results not shown).

Figure 1. Scatter plot and regression lines of interest spreads against maturity.



We have used the jitter option in Stata to show the mass of the data.

To deal with this issue more formally, we estimate a regression where we explain the interest spread by maturity and several polynomials of maturity. When including only long-term bullet loans (Regression 1 in Table 3), maturity does not have a significant impact. In Regression (2) we combine both short-term and (long-term) bullet loans, and add a dummy variable that equals 1 if maturity is longer than 2 years. The idea is that the relationship between maturity and interest spread should show a discontinuity at a maturity of 2 years.[37] According to Regression (2) of Table 3, maturity has a (mostly weak) significant impact on the interest spread, but so does the dummy. So, indeed, there appears to be a structural break. To get an idea of a potential term structure on interest rates, Figure 2 plots the predicted interest spreads (based upon the regression coefficients in Table 3) against maturity. The line in Figure 2a is based on Regression (1) (thus excluding short-term loans), the line in Figure 2b is based on Regression (2) (including short-term loans). According to Figure 2a, there is hardly any relationship between interest spreads and maturity. According to Figure 2b, there is a sharp downfall in spreads after a maturity of 2 years. If maturity increases further, the

[37] This approach could be classified as a regression discontinuity design (Thistlethwaite and Campbell 1960; Lee and Lemieux 2010).

term structure is almost flat. Only at very high levels of maturity the line fluctuates more, which is partly due to the observations at the bottom right.[38]

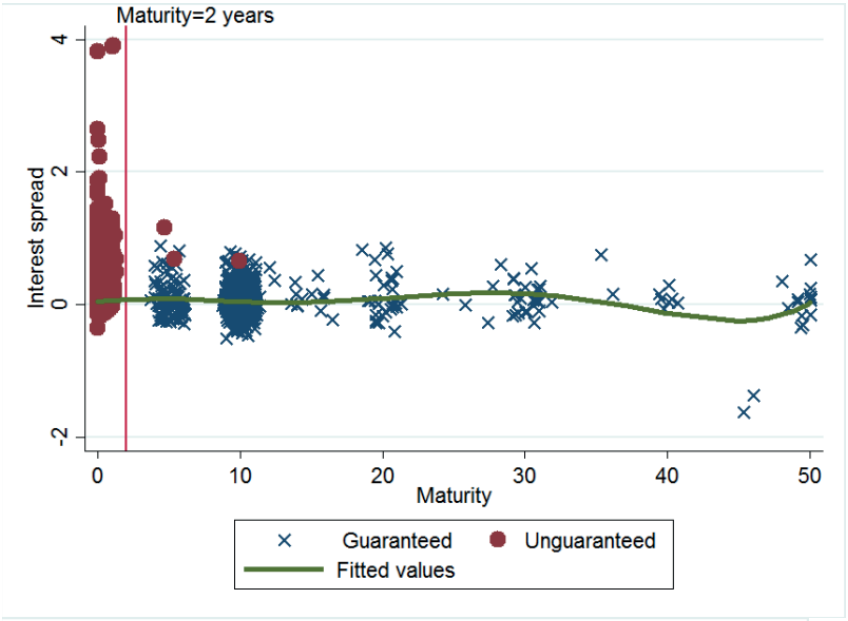
Table 3. Regression results of interest spreads against maturity.

	(1) Bullet loans (long-term)	(2) Short-term and (long-term) bullet loans
Maturity	0.0353	0.2191
	(0.2323)	(1.5702)
$Maturity^2$	-0.0075	-0.0290*
	(-0.4024)	(-1.7077)
$Maturity^3$	0.0005	0.0016*
	(0.5577)	(1.8451)
$Maturity^4$	-0.00001	-0.00004*
	(-0.6831)	(-1.9509)
$Maturity^5$	1.28e-07	2.99e-07**
	(0.7761)	(2.0218)
Dummy maturity>2 years		-0.9124**
		(-2.3903)
Constant	0.0431	0.4314***
	(0.1051)	(16.0886)
Observations	978	2,304
R-squared	0.0314	0.3579

Robust t-statistics (based upon clustered standard errors) in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

[38] These might be outliers due to administrative mistakes, or because of specific circumstances concerning the loan or the borrowing corporation. The dataset does not allow us to find this out.

Figure 2a and 2b. Estimated term structure of interest spreads.



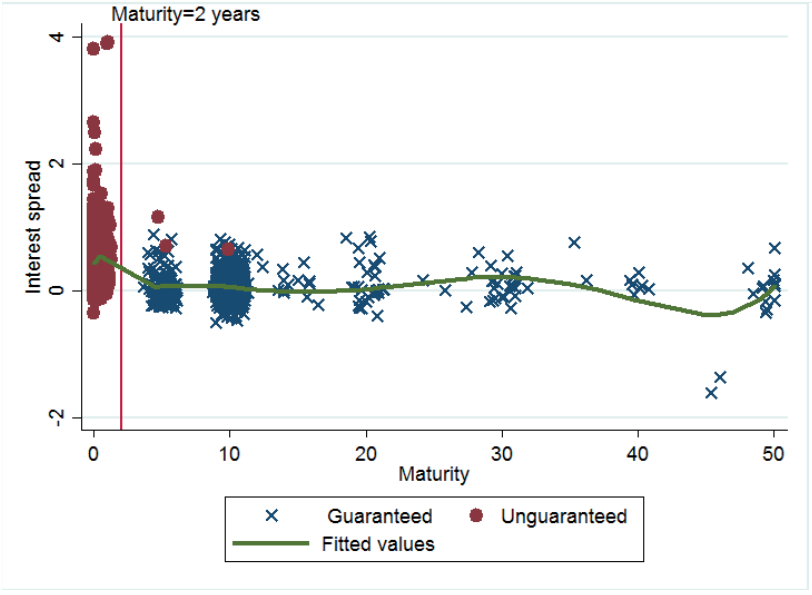


Figure 2a: line based on Regression (1) in Table 3
Figure 2b: line based on Regression (2) in Table 3
We have used the jitter option in Stata to show the mass of the data.

All in all, although the dataset does not allow for a perfect identification strategy, we conclude that we find substantial evidence that the guarantee scheme succeeds in lowering interest

rates. Also, the no-bailout clause for unguaranteed loans appears to be credible.

To give an indication of the impact of the bailout clause, note that the total level of guaranteed corporation debt was 85.1 billion euro in 2014 (source: WSW 2015). According to Regression (1) in Table 2, without the bailout clause corporations would have to pay an additional 0.72 percent interest over this debt. This implies that the estimated benefits to society of the bailout would be around 610 million euro (85.1 billion*0.72%) per year in reduced interest payments.[39] Using the coefficient of Regression (6), the savings would be around 700 million euro (85.1 bln*0.82%).

The direct costs of the bailout clause could be shown in the total loan sum on which corporations defaulted. Although we do not have this information directly, we do know the amount of reorganisation subsidies provided to corporations in order to restore their financial position. As noted in section 4.2.2, from 31 December, 1990 until 2014, the CFV provided 1.5 billion euro in reorganisation subsidies (in 2014 euros). Note that there may also be secondary costs involved if, for example, the bailout clause led to operational inefficiency. It is not possible to measure this, however, as there are no corporations that do not operate under the bailout clause. But we do know that these costs would have to be substantial in order to outweigh the benefits of the bailout clause. Indeed, if we compare the estimate of yearly benefits (610 million euro) with the direct costs of about 63 million euro (1.5 billion/24 years), the indirect costs of the bailout clause would have to amount to nearly 550 million euro per year for the bailout clause to be considered undesirable.[40]

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[39] Note that these are gains to society. Indeed, the bank would be indifferent between making a risk-free loan at the risk-free rate and a risky loan at a higher rate. Corporations would of course prefer the former. Therefore, the reduction in interest payments is a pure gain to the social housing sector, and because corporations have the obligation to use all of their resources for social housing, these are gains to society.

[40] Note that while the bailout clause also leads to monitoring costs for (the CFV and) the WSW, at the same time it relieves BNG Bank from monitoring. Although it is uncertain who would have lower monitoring costs, we presume that the difference between the two is not large enough to effect the desirability of the bailout clause.

4.6.2 Hypothesis 2

According to Regressions (2)-(4) in Table 2, corporation characteristics have no influence on the interest spreads for guaranteed loans. This is in line with Hypothesis 2; BNG Bank does not appear to monitor corporations when providing guaranteed loans. One might note, however, that these regressions may suffer from overestimated standard errors due to multicollinearity among regressors. Indeed, the regressors all measure the financial position of corporations in some way. However, the Variance Inflation Factors (VIF) presented in Table 3 a. lie well below 10 (except Maturity and squared Maturity), so multicollinearity does not seem troublesome.

Table 3 a. Variation inflation factors.

Variable	VIF
Company Value per dwelling (in 1000 euros)	3,73
Long-term debt per dwelling (in 1000 euros)	3,9
Equity per dwelling (at time t) (in 1000 euros)	2,43
Expected Equity per dwelling (at time t+5) (in 1000 euros)	2,54
Net cash flow per dwelling (in 1000 euros)	1,15
Dwellings	1,57
Loan sum (in 1000 euros)	9
Rating BNG (only relevant for unguaranteed loans)	7,28
Delay (days)	5,51
	4,95
Maturity (years)	27,73
	20,96
Gauranteed (dummy)	4,34

Also, removing variables (and for example keeping only long-term debt in the regression) does not alter our conclusions (results not shown). Additionally, one may note that the variation among corporations could be captured by the corporation dummies (fixed effects). However, removing the corporation dummies does not render the corporation characteristics significant.

Regression (5) shows that, in contrast to guaranteed loans, housing corporation characteristics are highly relevant for short-term (and thus unguaranteed) loans: higher company value, lower

long-term debt and higher expected equity all lead to a reduction of interest spreads. This is also in line with Hypothesis 2. The main exception, however, is the significant positive effect of equity on the interest spread. This appears to be counterintuitive, as higher equity implies a more favourable financial position (CFV (Centraal Fonds Volkshuisvesting), 2012), which in turn should decrease rather than increase interest rates. One may argue that corporations with high equity become lax in their search for low funding costs because of their favourable prospects.[41] We note however that the results from Regression (5) are not robust among all specifications. For example, the coefficient on *equity* becomes insignificant once all other corporation characteristics are excluded. Also, the other variables lose significance in some cases (results not shown). This means that although it is likely that monitoring is present, the evidence is not fully robust.

Another confirmation of Hypothesis 2 is the fact that the risk rating BNG Bank allocates to each unguaranteed loan positively influences the interest spread.

Finally, it appears that the scale of the housing corporation (i.e., the number of dwellings) is only relevant for short-term (unguaranteed) loans. If the number of dwellings increases, the interest spread increases as well. This is rather surprising as we would have expected a negative relationship (see section 4.3.2). It could be that for larger housing corporations, the stakes are higher, so that monitoring is conducted more strictly.

4.6.3 Hypothesis 3

According to Table 1, even guaranteed corporation loans show a positive interest spread of 7 basis points on average, while for municipalities, the average spread is just zero. Equation (3b) shows that this may be due to non-recoverable costs (c). As noted, non-recoverable costs

[41] If this would be the case, one may be surprised that we do not find an effect of equity on the interest spread for guaranteed loans. However, it may be more easy to bargain on guaranteed loans, because for these loans, BNG Bank publicly provides a target price (see section 5.2).

are probably more relevant for housing corporations than for municipalities, and therefore, interest spreads on guaranteed housing corporation loans may exceed interest spreads on municipality loans. We can compare interest rates of both groups of organisations by estimating Equation (5). The results in Table 4 indicate that there is no significant difference in interest rates between corporations and municipalities as the corporation dummy is insignificant in all regressions. Therefore, we reject Hypothesis 3 and conclude that non-recoverable costs are not relevant. This suggests that the bailout clause for housing corporations (securing individual loans) succeeds in matching the one for municipalities (which entirely protects municipalities from defaulting). Both clauses seem equally credible.

Still, it may be puzzling to see that interest rates for guaranteed housing corporation loans exceed their risk-free reference rates. As noted in section 4.3.1, this positive interest spread might be due to BNG Bank succeeding in obtaining positive commercial margins. A commercial margin may be the result of bargaining practices. Indeed, Allers and Van Ommeren (2016) present evidence suggesting that intermunicipal organisations can reduce interest rates on loans from BNG Bank by bargaining more effectively. It could also be the case that BNG Bank has lower funding costs than other banks because of implicit subsidies (see section 4.2.1). Further research is needed to solve this issue.

Table 4. Regression results of interest spreads: comparison of corporations and municipalities.

	(1) All guaranteed loans	(2) Bullet loans	(3) Annuity loans	(4) Linear loans
Loan sum	-0.0031***	-0.0026***	-0.0026**	-0.0032***
	(-9.0537)	(-3.9833)	(-2.5247)	(-5.6406)
Loan sum^2	0.0000***	0.0000**	0.0000	0.0000**
	(5.5420)	(2.2311)	(1.2710)	(2.5494)
Delay(*1000)	0.8639***	1.1421***	0.8728***	0.8687***
	(26.8314)	(17.1171)	(16.1885)	(19.7033)
Delay(*1000)^2	-0.1655***	-0.6228***	-0.1903***	-0.1288***
	(-5.5507)	(-7.2900)	(-3.6434)	(-3.7067)
Maturity	-0.0054***	0.0003	-0.0087***	-0.0076***
	(-6.0304)	(0.1002)	(-4.8993)	(-4.8429)
Maturity^2	0.0001***	-0.0000	0.0002***	0.0002***
	(5.3575)	(-0.2108)	(5.8701)	(4.3455)
Linear loan	-0.0177***			
	(-3.0520)			
Bullet loan	-0.0282***			
	(-4.1534)			
Corporation dummy	0.0035	0.0045	-0.0087	0.0075
	(0.7211)	(0.6329)	(-1.0402)	(0.8203)
Constant	-0.0496***	0.1531	0.0115	0.0158
	(-3.0204)	(1.4161)	(0.3199)	(1.0450)
Observations	6,324	1,454	1,136	3,734
R-squared	0.6703	0.5984	0.6675	0.7158

Robust t-statistics in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Year dummies included.

4.7 Sensitivity Analysis

We test the robustness of our results from Hypotheses 1 and 2 in six ways. This section briefly describes the results, for a more extensive discussion, see the appendix to this chapter.

Firstly, we define an interest spread in relative (rather than absolute) terms. We find that the coefficient on *guaranteed* now differs significantly between Regressions (1) and (2) (see Table 5). Therefore, it seems that an interest premium is charged in basis points, rather than a percentage. This makes the absolute spread more appropriate.

Secondly, we include loans for which only inter- or extrapolated reference rates are available. For example, the reference rate of a bullet loan with a maturity of 8 years can be found by

interpolating the reference rates for a 5-year loan and a 10-year loan. This increases the total number of observations from 2,791 (Table 2) to 5,587 (Table 5). The bailout effect is reduced somewhat (from -0.72 in Table 2 to -0.66 in Table 6) with estimated interest savings of about 560 million euro (85.1 bln*0.66%). Additionally, the results still indicate that corporation characteristics are only relevant for unguaranteed loans.

Thirdly, the results for non-clustered (but robust) standard errors are similar to the main results in Table 2.

Fourthly, we use the lagged scenario (instead of the standard scenario, see section 4.5.4). For guaranteed loans, results are similar to Table 2. However, for unguaranteed loans, most corporation characteristics lose significance (details can be found in the appendix to this chapter). It appears likely therefore that BNG Bank is aware of a corporation's circumstances before its financial data become publicly available in its annual report.

Fifthly, we remove all loans with a maturity up to one month. The number of observations falls sharply, but the coefficient on *guaranteed* remains similar to the main results.

Sixthly, we investigate whether there is a difference in monitoring in the pre- and post-crisis period, i.e., before or after 16 September 2008. According to Zipfel and Zimmer (2013), there is reason to believe that since the economic crisis, suppliers of capital may be more aware of the riskiness of, for example, subnational governments. Note that nearly all the short-term loans we study were made after September 2008 whereas our dataset contains guaranteed loans for the pre-crisis period as well. It may be the case that since the crisis, corporation characteristics are also relevant for guaranteed loans. To test this, we include interaction terms

between the corporation characteristics and a crisis dummy which equals 1 for all loans made from 16 September 2008 onwards and zero otherwise. Hardly any significant results appear so that we find no evidence of extra monitoring activities since the crisis.

Table 5. Regression results of sensitivity analysis.

Change in model		(1)[a] All loans	(2) Bullet loans	(3) Annuity loans	(4) Linear loans	(5) Short-term loans	(6)[a] Bullet & Short-term loans
	Corporation characteristics	Insignificant	Insignificant	Insignificant	Insignificant	Significant	Insignificant
Relative interest spread	Guaranteed	-1.5646***	-0.2475***				-1.5505***
		(-5.0371)	(-5.6311)				(-4.0150)
	Observations	2,791	810	486	209	1,260	2,096
	Corporation characteristics	Insignificant	Insignificant	Insignificant	Insignificant	Significant	Insignificant
Inter- and extrapolation included	Guaranteed	-0.6621***	-0.8791***				-0.7195***
		(-9.6187)	(-7.1347)				(-7.9756)
	Observations	5,587	3,039	898	359	1,264	4,330
	Corporation characteristics	Insignificant	Insignificant	Insignificant	Insignificant	Significant	Sometimes significant
No clustering of standard errors	Guaranteed	-0.7232***	-0.8617***				-0.8164***
		(-13.0116)	(-8.0013)				(-11.4642)
	Observations	2,791	810	486	209	1,260	2,096
	Corporation characteristics	Insignificant	Insignificant	Insignificant	Insignificant	Insignificant	Insignificant
Lagged corporation variables	Guaranteed	-0.7233***	-0.8000***				-0.7950***
		(-8.2314)	(-7.4060)				(-6.8613)
	Observations	2,635	759	370	197	1,283	2,068
	Corporation characteristics	Insignificant				Sometimes significant	Insignificant
Loans with maturity<1 month excluded	Guaranteed	-0.7291***					-0.7719***
		(-5.3814)					(-5.5121)
	Observations	1,714				190	1,019
	Corporation characteristics (before crisis)	Insignificant	Sometimes significant	Insignificant	Insignificant	Significant	Insignificant
Including interaction with crisis dummy	Corporation characteristics (after crisis)	Insignificant	Insignificant	Insignificant	Insignificant	Significant	Sometimes significant
	Guaranteed	-0.8121***	-0.8327***				-0.9373***
		(-7.4399)	(-9.2415)				(-6.8100)
	Observations	2,791	810	486	209	1,260	2,096

Robust t-statistics in parentheses.
*** p<0.01, ** p<0.05, * p<0.1
Year and corporation dummies (fixed effects) included.
[a] Dummy variables denoting the type of loan and *Rating BNG* are omitted because of multicollinearity with *Guaranteed*.
The number of observations in Regression (1) does not equal the sum of Regressions (2)-(5), because *Rating BNG* is not available for all unguaranteed loans.

We also test the robustness of Hypothesis 3 by including inter- and extrapolated loans. Table 6 shows that the corporation dummy becomes significant in Regression (1), but the coefficient is very small (about 1 basis point) and loses significance again in the other regressions.[42] Therefore, we conclude that we fail to find robust evidence of non-recoverable costs.

Table 6. Regression results: comparison of corporations and municipalities (inter- and extrapolation included).

	(1) All guaranteed loans	(2) Bullet loans	(3) Annuity loans	(4) Linear loans
Corporation dummy	0.0130**	0.0083	-0.0088	0.0074
	(1.9843)	(0.8398)	(-0.4574)	(0.7189)
Constant	0.0566***	-0.1138***	0.0118	-0.0470**
	(2.8517)	(-3.2257)	(0.1847)	(-2.0981)
Observations	11,062	4,746	1,992	4,324
R-squared	0.2974	0.2898	0.2213	0.6391

Robust t-statistics in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Loan characteristics and year dummies included.

4.8 Conclusion

The Dutch (semi-)public sector is characterized by its bailout clauses. Though short-term loans to housing corporations are not guaranteed, most long-term corporation loans are explicitly guaranteed. The bailout clause for corporations consists of three levels: the first two relying on mutual solidarity, and the third on governmental support. In spite of what one would expect based on the literature, only rarely has the guarantee scheme been called upon. Recently, however, incidents involving the housing corporation sector have brought back the plea to rein in or even abolish the bailout clause.

In this paper we have compared interest spreads (i.e., the difference between the actual interest rate paid and a risk-free reference rate) of guaranteed and unguaranteed corporation loans provided by BNG Bank, the market leader in this sector. While controlling for other

[42] Significance is also lost when including $Delay^3$ (which is significant) in Regression (1) of Table 6 (details not shown).

relevant factors we have found that the guarantee scheme lowers interest rates by about 72 basis points. This yields yearly benefits to the social housing sector of around 610 million euro in reduced interest payments. Comparing this with the bailout payments provided to rescue corporations (1.5 billion euro in 24 years), it appears likely that the bailout clause has had a positive net benefit. This means that the bailout clause would only be undesirable if it led to very high indirect costs such as, for example, loss of efficiency.

The relevance of the bailout clause is again confirmed by our finding that a housing corporation's financial position (or riskiness) influences interest spreads for unguaranteed loans only. This indicates that, in our research period, BNG Bank did not monitor corporations when providing guaranteed loans, but relied on the credibility of the bailout clause and the assessment of the supervisory authorities (CFV and WSW). For unguaranteed loans, however, BNG Bank does monitor the riskiness of corporations as well as that of the project being financed.

Finally, we find that interest rates on guaranteed housing corporation loans exceed their risk-free reference rates. In theory, this may imply that the creditor charges a premium for non-recoverable costs in case of default, despite the guarantee scheme. This would mean that guaranteed loans are not completely risk-free. However, we argue that non-recoverable costs are not relevant for housing corporations. If they were, we would expect corporations to pay higher interest rates than municipalities as non-recoverable costs would be higher for corporations than for municipalities. This is because BNG Bank would be involved in the bailout process if a corporation defaults, whereas for municipalities, the bailout would work automatically. However, we find no structural significant difference between the two. The guarantee scheme for housing corporations (securing individual loans) reduces interest rates to the same extent as the one for municipalities (whose entire financial position is secured). Positive interest spreads probably reflect a commercial margin.

We emphasize that we do not argue that bailout clauses are desirable under all circumstances, but rather that they are not undesirable per se. Further study is needed to investigate whether our findings also hold for other bailout clauses.

Appendix: Sensitivity Analysis

We test the robustness of our results from Hypotheses 1 and 2 in six ways. This section briefly describes the results. Firstly, we define an interest spread in relative (rather than absolute) terms. Secondly, we include loans for which only inter- or extrapolated reference rates are available. Thirdly, we show the results for non-clustered (but robust) standard errors. Fourthly, we use the lagged scenario (instead of the standard scenario, see section 4.6.4). Fifthly, we remove all loans with a maturity up to one month and finally, we investigate whether there is a difference in monitoring in the pre- and post-crisis period, i.e., before or after 16 September 2008.

Allers and Van Ommeren (2016) argue that a relative interest spread can control more precisely for interest changes over time and differences between loan types (compared with an absolute spread). Therefore, Table A1 uses a relative spread, for which our dependent variable becomes:

$$r_{i,j,t}^{spread} = \frac{r_{i,j,t}^{c} - r_{i,t}^{f}}{r_{i,t}^{f}} \tag{8}$$

We find that the coefficient on *guaranteed* now differs significantly between Regressions (1) and (2). This may be due to the fact that Regression (1) includes unguaranteed (short-term) loans with relatively low interest rates while Regression (2) includes only long-term loans with relatively high interest rates. This contrasts with our main results in which the coefficients were similar. Therefore, it seems that BNG Bank increases its required interest rate by a certain amount of basis points for unguaranteed loans, rather than a percentage. This makes the absolute spread more appropriate.

Table A1. Regression results of interest spreads (relative interest spread).

	(1)[a] All loans	(2) Bullet loans	(3) Annuity loans	(4) Linear loans	(5) Short-term loans	(6)[a] Bullet & Short-term loans
Corporation characteristics						
Company value	-0.0039	0.0008*	-0.0005	-0.0000	-0.3187***	-0.0099
	(-0.4870)	(1.8212)	(-1.0613)	(-0.0177)	(-8.2688)	(-0.5529)
Long-term debt	0.0083	-0.0008	-0.0005	-0.0005	0.1017***	0.0247
	(1.2345)	(-1.4146)	(-0.5726)	(-0.7313)	(6.7822)	(1.4492)
Equity	0.0080	-0.0001	0.0003	-0.0004	0.2761***	0.0322
	(0.6103)	(-0.1405)	(0.2654)	(-0.1801)	(7.8292)	(1.5458)
Equity t+5	0.0043	0.0009	0.0004	0.0012	-0.1229***	-0.0079
	(0.3948)	(1.5444)	(1.1736)	(0.8611)	(-4.0652)	(-0.4265)
Net cash flow	-0.0247	0.0002	0.0014	0.0028	0.7123*	-0.0263
	(-0.9211)	(0.0790)	(0.5379)	(0.6834)	(2.0555)	(-0.6699)
Dwellings	0.0009	-0.0003	0.0000	0.0033	0.2594***	0.0059
	(0.1261)	(-0.3598)	(0.0876)	(0.3558)	(6.5807)	(0.4538)
Loan characteristics						
Guaranteed	-1.5646***	-0.2475***				-1.5505***
	(-5.0371)	(-5.6311)				(-4.0150)
Rating BNG					0.9458***	
					(3.9409)	
Loan sum	-0.0120**	-0.0022**	-0.0001	-0.0014*	-0.0085*	-0.0080*
	(-2.1668)	(-2.2667)	(-0.1282)	(-1.9409)	(-1.9204)	(-1.7784)
Loan sum^2	0.0001	0.0001*	-0.0000	0.0000	0.0002*	0.0001
	(1.5323)	(1.7817)	(-0.6779)	(1.4221)	(2.0506)	(1.2404)
Delay (*1000)	0.3470	0.3498***	0.2018***	0.2545***	-54.7244**	0.3893
	(1.3393)	(9.0611)	(8.6681)	(4.8619)	(-2.3009)	(0.7549)
Delay (*1000)^2	-0.2403	-0.2132***	-0.0518*	-0.1332**	6,484.2109***	-0.2349
	(-0.8696)	(-3.9329)	(-1.6559)	(-2.4330)	(3.5505)	(-0.4102)
Maturity	-0.0193	-0.0007	-0.0029***	-0.0021*	-9.4085***	-0.0806***
	(-1.4643)	(-0.4043)	(-3.9131)	(-1.6899)	(-3.8652)	(-2.6826)
Maturity^2	0.0005*	0.0000	0.0001***	0.0000	7.4666	0.0018***
	(1.8664)	(0.1305)	(4.3535)	(1.4183)	(1.3302)	(3.0520)
Constant	1.5062***	0.1508*	0.0184	-0.1945	9.0857***	2.1900*
	(4.1637)	(1.7502)	(0.2240)	(-0.2996)	(6.6550)	(1.9247)
Observations	2,791	810	486	209	1,260	2,096
R-squared	0.6238	0.7445	0.8773	0.8952	0.8778	0.6415

Robust t-statistics (based upon clustered standard errors) in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Year and corporation dummies (fixed effects) included.

[a] Dummy variables denoting the type of loan and *Rating BNG* are omitted because of multicollinearity with *Guaranteed*.

The number of observations in Regression (1) does not equal the sum of Regressions (2)-(5), because *Rating BNG* is not available for all unguaranteed loans.

When including inter- and extrapolated observations, the total number of observations increases from 2,791 (Table 2) to 5,587 (Table A2). Inter- and extrapolation is conducted as follows. For example, the reference rate of a bullet loan with a maturity of 8 years can be found by interpolating the reference rates for a 5-year loan and a 10-year loan. For a 3-year bullet loan, we interpolate for the 12-month Euribor rate and the 5-year rate. For bullet loans with a maturity longer than 10 years, we use the reference rate for a 10-year loan. The bailout effect is reduced somewhat (from -0.72 in Table 2 to -0.66 in Table A2). Using this coefficient, the annual interest savings as a result of the bailout would be about 560 million

euro (85.1 bln*0.66%). Additionally, the results still indicate that corporation characteristics are only relevant for unguaranteed loans.

Table A2. Regression results of interest spreads (inter- and extrapolation included).

	(1)[a] All loans	(2) Bullet loans	(3) Annuity loans	(4) Linear loans	(5) Short-term loans	(6)[a] Bullet & Short-term loans
Corporation characteristics						
Company value	0.0002	-0.0006	0.0010	-0.0026*	-0.0425***	-0.0001
	(0.1339)	(-0.3454)	(0.3332)	(-1.6996)	(-5.2164)	(-0.0423)
Long-term debt	0.0002	0.0001	-0.0046*	0.0025**	0.0181**	0.0017
	(0.1523)	(0.0536)	(-1.8822)	(2.0086)	(2.6910)	(0.6699)
Equity	0.0039	0.0009	-0.0072	0.0080	0.0532***	0.0042
	(1.5889)	(0.2675)	(-1.0283)	(1.1899)	(8.6168)	(1.2261)
Equity t+5	0.0010	0.0028	0.0024	-0.0020	-0.0408***	-0.0012
	(0.5449)	(0.9909)	(0.9143)	(-0.5252)	(-3.3961)	(-0.4121)
Net cash flow	-0.0073	0.0046	0.0021	0.0028	0.0622	0.0065
	(-1.0973)	(0.6142)	(0.1340)	(0.2013)	(0.8054)	(0.8117)
Dwellings	-0.0016	-0.0013	-0.0012	0.0050	0.0254***	-0.0042
	(-0.6253)	(-0.2756)	(-0.4528)	(0.2095)	(3.6510)	(-1.0728)
Loan characteristics						
Guaranteed	-0.6621***	-0.8791***				-0.7195***
	(-9.6187)	(-7.1347)				(-7.9756)
Rating BNG					0.1247*	
					(1.8332)	
Loan sum	-0.0038**	-0.0051*	-0.0016	-0.0006	-0.0036	-0.0053***
	(-2.2746)	(-1.6808)	(-0.7323)	(-0.2138)	(-1.3859)	(-2.9737)
Loan sum^2	0.0000	0.0000	0.0000	-0.0000	0.0001	0.0001**
	(1.5168)	(1.1963)	(0.4847)	(-0.4041)	(1.3145)	(1.9955)
Delay(*1000)	0.5968***	0.5537***	0.7296***	0.9071***	-29.8676***	0.5730***
	(6.3890)	(5.4408)	(5.1086)	(8.5582)	(-3.0554)	(5.3539)
Delay(*1000)^2	-0.2621**	-0.2380**	-0.2535	-0.5498***	1,559.3548**	-0.2544**
	(-2.5109)	(-2.2795)	(-1.5729)	(-7.0550)	(2.1202)	(-2.2719)
Maturity	0.0164***	0.0270***	-0.0123***	-0.0080**	-1.5637	0.0284***
	(5.8323)	(7.2077)	(-2.6987)	(-2.3437)	(-1.3276)	(7.0079)
Maturity^2	-0.0003***	-0.0005***	0.0003***	0.0002***	3.2020*	-0.0005***
	(-5.2664)	(-7.0356)	(3.3883)	(2.8800)	(2.0155)	(-6.5694)
Constant	0.4789***	0.5305***	0.3568	-0.5581	0.1627	0.5382***
	(7.7555)	(3.7883)	(0.9195)	(-1.5814)	(0.5762)	(4.3275)
Observations	5,587	3,039	898	359	1,264	4,330
R-squared	0.4479	0.4498	0.6605	0.8634	0.6963	0.4904

Robust t-statistics (based upon clustered standard errors) in parentheses.
*** p<0.01, ** p<0.05, * p<0.1
Year and corporation dummies (fixed effects) included.
[a] Dummy variables denoting the type of loan and *Rating BNG* are omitted because of multicollinearity with *Guaranteed*. The number of observations in Regression (1) does not equal the sum of Regressions (2)-(5), because *Rating BNG* is not available for all unguaranteed loans.

Table A3 gives the results when standard errors are not clustered (yet still robust for heteroskedasticity). These results are similar to the main results in Table 2.

Table A3. Regression results of interest spreads (no clustering of standard errors).

	(1)[a] All loans	(2) Bullet loans	(3) Annuity loans	(4) Linear loans	(5) Short-term loans	(6)[a] Bullet & Short-term loans
Corporation characteristics						
Company value	-0.0001	0.0026**	-0.0012	-0.0001	-0.0459***	0.0009
	(-0.0935)	(2.0490)	(-0.7734)	(-0.0227)	(-7.9194)	(0.4197)
Long-term debt	0.0007	-0.0018	-0.0019	-0.0015	0.0181***	0.0028*
	(0.9436)	(-1.3117)	(-0.7665)	(-0.6628)	(3.8553)	(1.6793)
Equity	0.0048*	0.0002	0.0032	-0.0025	0.0584***	0.0102***
	(1.7666)	(0.0831)	(1.0393)	(-0.3063)	(8.2255)	(3.0025)
Equity t+5	-0.0031**	0.0021	0.0018	0.0050	-0.0418***	-0.0064***
	(-2.1274)	(1.3354)	(1.3000)	(0.8810)	(-5.5304)	(-2.8987)
Net cash flow	-0.0083	0.0006	0.0005	0.0003	0.0573	0.0044
	(-1.0761)	(0.0928)	(0.0587)	(0.0191)	(0.8912)	(0.4015)
Dwellings	-0.0013	0.0002	-0.0002	0.0050	0.0282***	-0.0024
	(-1.2316)	(0.1225)	(-0.1912)	(0.1764)	(4.8215)	(-1.2135)
Loan characteristics						
Guaranteed	-0.7232***	-0.8617***				-0.8164***
	(-13.0116)	(-8.0013)				(-11.4642)
Rating BNG					0.1391***	
					(4.0266)	
Loan sum	-0.0050***	-0.0067***	-0.0007	-0.0049	-0.0036**	-0.0032**
	(-3.9589)	(-2.6948)	(-0.4292)	(-0.6807)	(-2.1640)	(-2.2690)
Loan sum^2	0.0001***	0.0002*	-0.0000	0.0001	0.0001**	0.0000
	(2.7804)	(1.7689)	(-0.6408)	(0.6523)	(2.1879)	(1.6452)
Delay(*1000)	1.0980***	1.2394***	0.8697***	1.0186***	-29.6036**	1.2957***
	(14.6917)	(14.8296)	(13.8033)	(6.2196)	(-2.3245)	(11.3543)
Delay(*1000)^2	-0.5757***	-0.7394***	-0.2114***	-0.4923**	1,306.2816	-0.7679***
	(-6.2965)	(-6.5447)	(-2.9398)	(-2.5915)	(1.4718)	(-6.0520)
Maturity	-0.0030	-0.0011	-0.0108***	-0.0055	-1.5878**	-0.0076*
	(-1.1196)	(-0.2828)	(-4.4334)	(-1.0507)	(-2.3507)	(-1.7020)
Maturity^2	0.0001	-0.0000	0.0002***	0.0001	3.6256***	0.0002
	(1.0778)	(-0.0893)	(4.9552)	(0.6284)	(3.3362)	(1.5308)
Constant	0.6965***	0.5400***	-0.2155	-0.2226	1.1644***	0.5647***
	(7.3551)	(2.6414)	(-0.9858)	(-0.1115)	(5.2553)	(2.5866)
Observations	2,791	810	486	209	1,260	2,096
R-squared	0.6536	0.7735	0.8860	0.8926	0.6951	0.6752

Robust t-statistics in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Year and corporation dummies (fixed effects) included.

[a] Dummy variables denoting the type of loan and *Rating BNG* are omitted because of multicollinearity with *Guaranteed*.

The number of observations in Regression (1) does not equal the sum of Regressions (2)-(5), because *Rating BNG* is not available for all unguaranteed loans.

The results in Table A4 indicate the effect of using lagged corporation variables instead of standard variables (see section 4.5.4). For guaranteed loans (Regressions 2-4), results are similar to Table 2. However, Regression (5) shows that for unguaranteed loans, most corporation characteristics lose significance. It appears likely therefore that BNG Bank is aware of a corporation's circumstances before its financial data become publicly available in its annual report.

Table A4. Regression results of interest spreads (lagged corporation variables).

	(1)[a] All loans	(2) Bullet loans	(3) Annuity loans	(4) Linear loans	(5) Short-term loans	(6)[a] Bullet & Short-term loans
Corporation characteristics						
Company value	0.0038*	0.0030	0.0009	-0.0042	-0.0096	0.0032
	(1.7487)	(1.6205)	(0.5000)	(-0.2424)	(-0.5525)	(0.8341)
Long-term debt	-0.0019	-0.0016	-0.0054	0.0034	-0.0079	-0.0031
	(-1.0191)	(-1.2487)	(-1.3901)	(0.4348)	(-1.2304)	(-0.9660)
Equity	-0.0055	-0.0003	-0.0115*	-0.0056	-0.0219	-0.0051
	(-1.0663)	(-0.1083)	(-1.8107)	(-0.4147)	(-0.8815)	(-0.6951)
Equity t+5	-0.0041	-0.0000	0.0021	-0.0017	-0.0007	-0.0015
	(-1.0384)	(-0.0058)	(0.5587)	(-0.1641)	(-0.0450)	(-0.2527)
Net cash flow	0.0060	0.0111***	0.0007	-0.0569	-0.3359*	0.0094
	(0.6814)	(2.6328)	(0.0462)	(-1.1596)	(-1.8421)	(1.0764)
Dwellings	0.0009	0.0001	0.0002	-0.2631	0.0327	-0.0014
	(0.3777)	(0.0728)	(0.1628)	(-1.1465)	(1.5704)	(-0.3970)
Loan characteristics						
Guaranteed	-0.7233***	-0.8000***				-0.7950***
	(-8.2314)	(-7.4060)				(-6.8613)
Rating BNG					0.1298	
					(1.2491)	
Loan sum	-0.0046**	-0.0037*	0.0001	-0.0027	-0.0038	-0.0029
	(-2.1979)	(-1.7198)	(0.0302)	(-0.9548)	(-1.4130)	(-1.4008)
Loan sum^2	0.0001	0.0000*	-0.0000	0.0001	0.0001	0.0000
	(1.4342)	(1.7843)	(-0.6776)	(1.2575)	(1.1020)	(0.9301)
Delay(*1000)	1.2133***	1.3296***	0.7841***	0.8912***	-29.2971**	1.3941***
	(11.3925)	(14.6326)	(3.8731)	(3.2275)	(-2.4657)	(10.3810)
Delay(*1000)^2	-0.7087***	-0.8191***	-0.0466	-0.4538	1,731.7316**	-0.8325***
	(-5.1177)	(-6.0815)	(-0.1265)	(-1.5925)	(2.7130)	(-5.4406)
Maturity	-0.0047	-0.0038	-0.0135***	-0.0092	-1.4760	-0.0108*
	(-1.0313)	(-0.8419)	(-3.4722)	(-1.3972)	(-1.2915)	(-1.6896)
Maturity^2	0.0001	0.0001	0.0003***	0.0001	3.0260	0.0003*
	(1.2958)	(0.9023)	(3.5678)	(0.7971)	(1.6774)	(1.9529)
Constant	0.6562**	0.7866***	0.0549	18.9328	2.3994***	0.9624***
	(2.5532)	(6.7756)	(0.6034)	(1.1519)	(3.9397)	(11.9763)
Observations	2,635	759	370	197	1,283	2,068
R-squared	0.6717	0.8494	0.8783	0.8628	0.6270	0.6825

Robust t-statistics (based upon clustered standard errors) in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Year and corporation dummies (fixed effects) included.

[a] Dummy variables denoting the type of loan and *Rating BNG* are omitted because of multicollinearity with *Guaranteed*.

The number of observations in Regression (1) does not equal the sum of Regressions (2)-(5), because *Rating BNG* is not available for all unguaranteed loans.

Table A5 presents the results when all loans with a maturity up to one month are removed. As noted in section 4.5.2, we use a different reference rate (based on Euribor) for these loans. The number of observations falls sharply, but the coefficient on *guaranteed* remains similar to the main results.

Table A5. Regression results of interest spreads (loans with a maturity up to one month excluded).

	(1)[a] All loans	(2) Short-term loans	(3)[a] Bullet & Short-term loans
Corporation characteristics			
Company value	0.0017	-0.0613***	0.0043
	(1.1635)	(-4.6355)	(1.4377)
Long-term debt	-0.0005	-0.0138	0.0002
	(-0.6046)	(-0.5310)	(0.0537)
Equity	0.0014	0.0380*	0.0031
	(0.4849)	(1.7735)	(0.6222)
Equity t+5	-0.0006	-0.0158	-0.0024
	(-0.3954)	(-1.1469)	(-0.8073)
Net cash flow	0.0003	0.3842**	0.0133
	(0.0331)	(2.8266)	(1.0062)
Dwellings	-0.0007	0.1471***	-0.0002
	(-0.2837)	(3.6898)	(-0.0433)
Loan characteristics			
Guaranteed	-0.7291***		-0.7719***
	(-5.3814)		(-5.5121)
Rating BNG		0.6076*	
		(1.8414)	
Loan sum	-0.0083**	-0.0078**	-0.0093**
	(-2.2335)	(-2.7489)	(-2.0965)
Loan sum^2	0.0002*	0.0002***	0.0002***
	(1.6814)	(4.2981)	(2.7721)
Delay(*1000)	1.1485***	-19.6102	1.3655***
	(12.2924)	(-1.6894)	(9.2258)
Delay(*1000)^2	-0.6185***	647.3191	-0.8156***
	(-4.6891)	(0.7348)	(-4.6292)
Maturity	-0.0024	-0.4081	-0.0049
	(-0.6189)	(-1.5596)	(-0.8193)
Maturity^2	0.0001	0.9701	0.0001
	(0.6557)	(1.3956)	(0.7949)
Constant	0.5397*	-0.6645	0.1454
	(1.7506)	(-0.4419)	(0.4861)
Observations	1,714	190	1,019
R-squared	0.6153	0.9178	0.6750

Robust t-statistics (based upon clustered standard errors) in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Year and corporation dummies (fixed effects) included.

[a] Dummy variables denoting the type of loan are omitted because of multicollinearity with *Guaranteed*.

According to Zipfel and Zimmer (2013) there is reason to believe that the impact of debt levels on interest spreads reflects a structural break between the period before the global economic crisis began in 2008 and the period afterwards. They argue that since the economic crisis, suppliers of capital may well be more aware of the riskiness of, for example, subnational governments. Zipfel and Zimmer (2013) find that for German Länder, in the period prior to the collapse of Lehman on 15 September 2008, the relative economic output and the debt/GDP ratio had no significant impact on the interest spread, whereas in later years, they did find a significant impact. Note that nearly all the short-term loans we study were made after September 2008 whereas our dataset contains guaranteed loans for the pre-

crisis period as well. It may be the case that since the crisis, corporation characteristics are also relevant for guaranteed loans.

Table A6 repeats the regressions while including interaction terms between the corporation characteristics and a crisis dummy variable which equals 1 for all loans made from 16 September 2008 onwards and zero otherwise. The question whether corporation characteristics are significant after the crisis cannot be answered by examining only the coefficients on the interaction terms. Indeed, the marginal effect of for example company value on the interest spread if the crisis dummy equals one, is the sum of the direct effect (0.0009) and the interaction effect (-0.0064), which is -0.0055. In a similar fashion, the corresponding standard error has to be calculated accordingly (Brambor, Clark, & Golder, 2006). Table A6 therefore also presents the coefficients and corresponding t-values of the corporation characteristics, under the condition that the crisis dummy equals one. Hardly any significant results appear so that we find no evidence of extra monitoring activities since the crisis.

Table A6. Regression results of interest spreads (including interaction with crisis dummy).

	(1)[a] All loans	(2) Bullet loans	(3) Annuity loans	(4) Linear loans	(5) Short-term loans	(6)[a] Bullet & Short-term loans
Corporation characteristics						
Company value	0.0009	0.0048**	-0.0003	0.0016	-0.0459***	0.0067
	(0.5252)	(2.4830)	(-0.1901)	(0.6477)	(-6.3750)	(1.6476)
Long-term debt	-0.0005	-0.0056***	-0.0012	-0.0038	0.0181**	-0.0072
	(-0.3661)	(-2.9208)	(-0.3644)	(-1.3837)	(2.7593)	(-1.4402)
Equity	-0.0053	-0.0026	0.0052*	0.0055	0.0584***	-0.0148
	(-1.1246)	(-0.4380)	(1.8805)	(0.2733)	(11.1315)	(-1.0881)
Equity t+5	0.0021	0.0014	0.0010	0.0134*	-0.0418***	0.0046
	(1.0260)	(0.3979)	(0.5995)	(1.6734)	(-3.5570)	(0.9249)
Net cash flow	-0.0075	0.0060	-0.0008	-0.0040	0.0573	0.0089
	(-0.8972)	(1.1462)	(-0.0801)	(-0.1486)	(0.8098)	(1.0580)
Dwellings	0.0028	-0.0019	-0.0003	-0.0273	0.0282***	0.0067
	(1.2716)	(-0.6148)	(-0.2795)	(-0.7572)	(3.9619)	(1.2120)
Company value*Crisis dummy	-0.0064*	-0.0059*	0.0250	-0.0122		-0.0174***
	(-1.8786)	(-1.8706)	(1.2313)	(-0.9488)		(-3.1904)
Long-term debt*Crisis dummy	0.0042	0.0062*	-0.0030	0.0071		0.0160**
	(1.6350)	(1.9467)	(-0.2677)	(0.7546)		(2.2512)
Equity*Crisis dummy	0.0149**	0.0073	-0.0142	-0.0137		0.0350**
	(2.4197)	(1.2156)	(-1.1372)	(-0.7038)		(2.1374)
Equity t+5*Crisis dummy	-0.0092*	-0.0004	-0.0488	-0.0152		-0.0151*
	(-1.7609)	(-0.1068)	(-1.3710)	(-1.3199)		(-1.7193)
Net cash flow*Crisis dummy	0.0065	-0.0367	-0.3873**	-0.0087		-0.0110
	(0.1483)	(-0.9393)	(-2.1231)	(-0.1661)		(-0.2050)
Dwellings*Crisis dummy	-0.0049**	0.0017	0.0131**	-0.0068**		-0.0072**
	(-1.9912)	(0.8141)	(2.3858)	(-2.0669)		(-2.0969)
Loan characteristics						
Guaranteed	-0.8121***	-0.8327***				-0.9373***
	(-7.4399)	(-9.2415)				(-6.8100)
Rating BNG					0.1391**	
					(2.1057)	
Loan sum	-0.0048**	-0.0069**	0.0005	-0.0048	-0.0036	-0.0029
	(-2.4030)	(-2.3823)	(0.2536)	(-1.3424)	(-1.3735)	(-1.4079)
Loan sum^2	0.0001	0.0001*	-0.0001**	0.0001	0.0001	0.0000
	(1.5192)	(1.6867)	(-2.3362)	(1.5594)	(1.3049)	(0.9755)
Delay(*1000)	1.1436***	1.2523***	0.8577***	1.0462***	-29.6036***	1.3811***
	(10.8624)	(11.7956)	(9.2033)	(5.4099)	(-3.0343)	(8.6844)
Delay(*1000)^2	-0.6441***	-0.7522***	-0.2010*	-0.4788*	1,306.2816*	-0.8996***
	(-4.2587)	(-4.4550)	(-1.9726)	(-1.9029)	(1.8217)	(-4.9333)
Maturity	-0.0012	0.0009	-0.0106***	-0.0081	-1.5878	-0.0059
	(-0.2145)	(0.1808)	(-3.3661)	(-1.1949)	(-1.3484)	(-0.8573)
Maturity^2	0.0000	-0.0001	0.0002***	0.0001	3.6256**	0.0002
	(0.3950)	(-0.3410)	(3.9884)	(0.9881)	(2.2082)	(0.9176)
Constant	0.7561***	0.6629	0.0659	2.7012	1.1644***	0.7111**
	(5.7473)	(1.4125)	(0.3089)	(1.0693)	(3.3126)	(2.4785)
Observations	2,791	810	486	209	1,260	2,096
R-squared	0.6629	0.7811	0.8918	0.9108	0.6951	0.6906
Panel B: Cumulative effect of interaction terms (if Crisis dummy=1)						
Company value	-0.0055	-0.0011	0.0247	-0.0106	-0.0459***	-0.0107*
	(-1.5366)	(-0.3601)	(1.2345)	(-0.7893)	(-6.3750)	(-1.9346)
Long-term debt	0.0037	0.0006	-0.0042	0.0033	0.0181**	0.0088**
	(1.4088)	(0.2463)	(-0.3668)	(0.3819)	(2.7593)	(2.021)
Equity	0.0096*	0.0047*	-0.0090	-0.0082	0.0584***	0.0202***
	(1.7624)	(1.6861)	(-0.6699)	(-1.1027)	(11.1315)	(2.8162)
Equity t+5	-0.0071*	0.0010	-0.0478	-0.0018	-0.0418***	-0.0105*
	(-1.6808)	(0.5496)	(-1.3264)	(-0.253)	(-3.5570)	(-1.796)
Net cash flow	-0.0010	-0.0307	-0.3881**	-0.0127	0.0573	-0.0021
	(-0.0242)	(-0.7833)	(-2.08)	(-0.2418)	(0.8098)	(-0.0397)
Dwellings	-0.0021	-0.0002	0.0128**	-0.0341	0.0282***	-0.0005
	(-1.1168)	(-0.1073)	(2.2738)	(-0.9153)	(3.9619)	(-0.134)

Robust t-statistics (based upon clustered standard errors) in parentheses.
*** p<0.01, ** p<0.05, * p<0.1
Year and corporation dummies(fixed effects) included.
[a] Dummy variables denoting the type of loan and *Rating BNG* are omitted because of multicollinearity with *Guaranteed*.The number of observations in Regression (1) does not equal the sum of Regressions (2)-(5), because *Rating BNG* is not available for all unguaranteed loans and because annuity loans are omitted.

Finally, the robustness of Hypothesis 3 is tested by including inter- and extrapolated loans. Table A7 shows that the corporation dummy becomes significant in Regression (1), but the coefficient is very small (about 1 basis point). Also, the coefficient loses significance again in the other regressions. Therefore, we conclude that we fail to find robust evidence of non-recoverable costs.

Table A7. Regression results of interest spreads: comparison of corporations and municipalities (inter- and extrapolation included).

	(1) All guaranteed loans	(2) Bullet loans	(3) Annuity loans	(4) Linear loans
Loan sum	-0.0028***	-0.0024***	-0.0019	-0.0023***
	(-5.6749)	(-2.6415)	(-1.2067)	(-3.5076)
Loan sum^2	0.0000***	0.0000	0.0000	0.0000***
	(3.0120)	(0.1756)	(0.2354)	(2.7281)
Delay(*1000)	0.6885***	0.6495***	0.8305***	0.8210***
	(21.5429)	(12.1535)	(12.0151)	(19.4010)
Delay(*1000)^2	-0.1687***	-0.3037***	-0.2113***	-0.1234***
	(-5.4864)	(-5.5280)	(-3.5888)	(-3.2123)
Maturity	0.0082***	0.0228***	-0.0022	-0.0098***
	(6.8724)	(12.2186)	(-0.7578)	(-7.3657)
Maturity^2	-0.0002***	-0.0004***	0.0001**	0.0002***
	(-5.5659)	(-10.3862)	(2.1826)	(6.8986)
Linear loan	-0.0791***			
	(-8.6466)			
Bullet loan	0.0129			
	(1.3731)			
Corporation dummy	0.0130**	0.0083	-0.0088	0.0074
	(1.9843)	(0.8398)	(-0.4574)	(0.7189)
Constant	0.0566***	-0.1138***	0.0118	-0.0470**
	(2.8517)	(-3.2257)	(0.1847)	(-2.0981)
Observations	11,062	4,746	1,992	4,324
R-squared	0.2974	0.2898	0.2213	0.6391

Robust t-statistics in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Year dummies included.

In short, the robustness checks do not lead to different conclusions. Firstly, the bailout clause still appears to reduce interest rates. Secondly, the findings that the relationship between corporation characteristics and the interest spread is only relevant for unguaranteed loans remains robust. Thirdly, we find no robust evidence that non-recoverable costs are relevant.

5 Intermunicipal cooperation, municipal amalgamation and borrowing costs[43]

In many countries, local government size is increasingly thought to be insufficient to operate efficiently. Two possible solutions to this problem are amalgamation and intermunicipal cooperation. This paper applies a novel methodology to shed light on the efficiency implications of this choice. Using a unique and rich micro-level dataset, we find that intermunicipal organisations (IOs) in the Netherlands consistently pay higher interest rates than municipalities, while there is no economic reason to do so. We interpret this as a form of inefficiency. Municipal amalgamation, on the other hand, does not result in higher interest rates. Our analysis eliminates one possible explanation, dispersed ownership of IOs, as the number of partners cooperating in an IO does not affect interest rates (no "law of 1/n"). This leaves the introduction of extra hierarchical layers as a result of cooperation, and the ensuing reduction in monitoring, as the most probable explanation.

5.1 Introduction

In many countries, local governments are believed to have a suboptimal size for offering public services efficiently, because of scale economies and because of spending spillovers. That is especially true in countries where amalgamation is rare or non-existent or where substantial public tasks have been decentralized recently. Local government can increase operating scale through amalgamation, through cooperation with other local governments and by contracting out to, or partnering with, private operators that also work for other local

[43] This chapter is based on Allers, M. A., & van Ommeren, B. J. (2016). Intermunicipal cooperation, municipal amalgamation and the price of credit. *Local Government Studies* , 42(5), 717-738.

governments. Each of these options may have very different implications. *Contracting out* requires a competitive market, which does not exist for many services for which local government is responsible. Results have often been disappointing (Bel, Fageda, & Warner, 2010). The same goes for public-private partnership (Andrews & Entwistle, 2010). This paper focuses on amalgamation and cooperation.

Amalgamations often lead to public resistance because communities fear loss of autonomy or identity. Larger jurisdictions may be less able to tailor local services to local demand (Oates, 1972). Moreover, amalgamation is a blunt instrument. Services offered by municipalities are quite heterogeneous. While for some (e.g., capital intensive) services they might operate under economies of scale, for other services the opposite may be true. Hence, increasing scale across the board could invoke efficiency gains in some public services and efficiency losses in others. Also, amalgamation may result in more bureaucracy.

Intermunicipal cooperation offers municipalities a way to increase scale of production for selected public services only, while continuing to provide other public services on a municipal level, and preserving local autonomy. Although intermunicipal cooperation is a widespread phenomenon (Hulst & van Montfort, (Eds) 2007), its effects on efficiency have not been extensively studied.

Cooperation may allow municipalities to exploit economies of scale (Bel, Fageda, & Mur, 2013), but it may also have effects that reduce efficiency. Corporate governance theory predicts that cooperation exacerbates agency costs and reduces the intensity with which the activities of public servants are monitored. A control system combining monitoring with sanctions and rewards (henceforth referred to as "monitoring") is needed to align public servants' objectives with those of citizens. Agency theory suggests three possible reasons for reduced monitoring, and, as a result, less efficiency, in intermunicipal organisations (IOs).

First, an extra tier in the hierarchy is introduced: the board of the IO. Adding hierarchical layers increases monitoring costs. Monitoring could be further hampered by the fact that the municipal governments' grip on an IO is weaker than that on their own organisation. In addition, intermunicipal cooperation in effect creates a common pool. When a particular municipality puts a lot of effort into monitoring an IO, much of the ensuing efficiency gain will benefit other participants. As a result, the level of monitoring is likely to be lower than that for the operations of the municipality itself. As this disincentive to monitor is a result of the existence of a common pool, its strength will depend on the size of this pool.

Empirical studies of intergovernmental cooperation often focus on determinants of cooperation e.g., (Feiock, Steinacker, & Park, 2009; Hefetz & Warner, 2011; Rodrigues, Tavares, & Araújo, 2012). Studies on the effects of intermunicipal cooperation are mostly case studies or survey studies (e.g., (Henderson, 2014; Bel & Warner, 2015) survey the literature, and find just eight econometric studies of the effect of cooperation on public service costs or spending. All of these study solid waste services, one of them in combination with water, electricity and gas. Results of these studies are mixed. Frère et al. (2014) find no effect of cooperation on total spending of French municipalities.

The results of econometric studies on the effects of municipal amalgamations, carried out in several European countries and in Israel, are mixed as well (Allers & Geertsema, 2016). In the United States, neither city-county consolidation nor city-city consolidation seems to result in significant efficiency gains (Leland & Thurmaier, Eds 2010; Gaffney & Marlowe., 2014).

Empirical studies of the effects of cooperation or amalgamation often focus on spending levels. Higher spending does not necessarily point to increased inefficiency, however. Efficiency depends on the ratio of output (or outcome) over input. Higher spending may simply reflect rising public service levels, leaving efficiency unaffected. Empirical studies in this field suffer from two fundamental problems (Geys & Moesen, 2009). The scarce output

indicators that are available are sometimes only crude proxies for the true level of public good provision. Moreover, such studies rely on strong assumptions (e.g., regarding the cost function), or they are vulnerable to data errors (if they use data envelopment analysis). Because all previous papers on the effects of intermunicipal cooperation focus on a service, waste, for which output is easy to quantify, the first problem does not necessarily apply to them. Indeed, output and quality are controlled for in some of these studies e.g., (Bel & Costas, 2006; Zafra-Gómez, Prior, Díaz, & López-Hernández, 2013).

Our approach is completely different from that of previous studies. Whereas previous studies on the effects of intermunicipal cooperation cover all costs of providing a single service, we focus on a single cost in a broad range of public services. We exploit a unique and rich micro-level dataset on the price both municipalities and IOs pay for a standard commodity: credit. We compare interest rates on loans to Dutch IOs, amalgamated municipalities, and municipalities that were not amalgamated. The credit risk for these loans is identical (i.e., zero). On identical loans, municipalities and IOs should be able to get the same terms. Thus, any systematic differences in interest rates would point ceteris paribus to differences in efficiency, without having to rely on strong assumptions inherent in the approaches chosen by previous studies.

We find that IOs pay higher interest rates than municipalities, while there is no economic reason to do so. We also find that the benefits of lower interest rates outweigh the extra bargaining cost they would require by a wide margin. Consequently, we interpret the higher interest paid by IOs as a form of inefficiency. However, the number of participating municipalities does not affect the interest rate paid by an IO. Thus, it is cooperation as such that results in higher interest rates, not the number of parties involved. This leaves the introduction of extra hierarchical layers as a result of cooperation and the limited influence of municipality governments on IO boards as the most probable explanations.

This study is highly relevant for both policy makers and scientists. In the Netherlands, the ongoing decentralisation of the public sector has been accompanied by a process towards amalgamation and intermunicipal cooperation. A linear extrapolation of the process shows a decrease of the number of municipalities from 1000 in 1950, 355 in 2019, towards 1 in 2051 (Allers, 2019). This process is fuelled by a government that assumes that municipalities that are cooperating on key tasks, operate less efficiently than amalgamated municipalities[44]. Amalgamation is implicitly assumed to be an efficient alternative to IOs, as it is implicitly assumed to lead to to fewer IOs. In the meantime, IOs are also less desirable because they lack direct democratic governance. However, it is not clear to what extent amalgamation operates more efficiently than IOs. The continuous scaling-up of municipalities as a result of amalgamation goes hand in hand with a decrease of democratic support by the citizens (Hansen, 2015; Lassen & Serritzlew, 2011; Houwelingen, 2017) and does not seem to lead to fewer IOs (Allers, 2019). These developments demand reconsideration of the actual situation of amalgamation and intermunicipal cooperation as well as a search for new solutions. This chapter investigates one of the key elements, whether there is evidence that intermunicipal cooperation is less efficient than amalgamation. The academic relevancy of this chapter lies in providing additional evidence regarding the efficiency implications of the choice between amalgamation and cooperation, and by using a novel method to estimate the effect of intermunicipal cooperation and amalgamation on efficiency.

5.2 Institutional background

5.2.1 Municipalities and intermunicipal organisations

Dutch municipalities are democratically governed jurisdictions with a broad set of responsibilities. Municipalities often cooperate to perform specific tasks, ranging from refuse

[44] Dutch coalition agreement 2017, october the 10th "Vertrouwen in de toekomst", www.kabinetssformatie2017.nl

collection to administering social welfare benefits. Cooperation is often aimed at reaping economies of scale. Other reasons to cooperate are that some municipalities are simply too small to perform every task independently, or that the catchment area of a public service exceeds the municipality's boundaries.

Dutch IOs cannot levy own taxes. In some cases, a grant is received from the central government, but most of their resources come from the participating municipalities. There are no limitations with respect to the number of cooperative arrangements, and municipalities are free to choose different partners for each (except for some cases where cooperation is mandatory, e.g. for fire brigades). The Joint Provisions Act enables municipalities to create *public bodies* (governed by public law), which are separate administrative entities that may employ staff, own assets, borrow money, etcetera. In case of financial distress, the participating municipalities are liable. Public bodies do not default. Municipalities may also create *public companies* under private law. Unlike public bodies, public companies can default, in which case shareholding municipalities lose their investment and creditors (part of) their claim. This does not happen often. In practice, municipalities occasionally bail out financially troubled public companies they participate in.

Municipalities are free to leave a public body or terminate their participation in a public company. In practice, however, this is not an easy step. The public services in question must then be provided by the municipality itself, or a different IO is to be joined. That may not always be feasible. Moreover, breaking up requires that all partners agree on a division of property and debt. There are no general rules for this.

Apart from these two main forms of cooperation, several other, looser types exist, e.g., foundations and informal communities of government officials in charge of specific public services. An alternative to intermunicipal cooperation is municipal amalgamation. Almost every year, some Dutch municipalities are amalgamated. Amalgamation may be voluntary or

mandatory, depending on the case (Allers & Geertsema, 2016). The number of municipalities gradually decreased from 572 in 1997 to 408 in 2013. With over 40,000 inhabitants on average, Dutch municipalities are large compared with those in other countries (Allers & Geertsema, 2016).

5.2.2 Local government borrowing

There are no legal limits to the amounts municipalities or IOs can borrow (Allers, 2015). There is no default risk associated with loans to municipalities. Dutch municipalities never go bankrupt, and neither do intermunicipal public bodies. The Financial Relations Act stipulates that a municipality may apply for a supplementary grant if revenues are significantly and structurally insufficient to cover necessary outlays. Bailouts occur often enough to be credible for potential lenders: ten times in 1998–2014 (Allers, 2015). This explicit bailout guarantee enables Dutch municipalities to borrow cheaply. This unique Dutch setting is explained in more detail in Chapter 2 and Chapter 3.

Unlike public bodies, public companies sometimes go bankrupt, although this happens rarely. Some of the loans to such companies are guaranteed by local governments. Non-guaranteed debt of public companies does carry credit risk, and is excluded from this study.

Most local governments borrow from banks; some of the bigger municipalities may hold loan auctions or issue bonds. Two Dutch banks specialize in loans to local governments, BNG Bank and NWB Bank. Apart from these banks, of which all shares are held by the central government and subnational governments, municipalities and IOs may borrow from commercial banks.

5.3 Theory and practice of risk-free credit

5.3.1 Theory

Both for municipalities and for public bodies, default risk is zero. Thus, there is no theoretical reason for banks to require different interest rates for loans to municipalities and to public bodies. For public companies, default risk is positive, but credit risk is zero, as their debt is guaranteed by default-free municipalities. However, some legal or administrative costs might be incurred in case a loan guarantee needs to be enforced, despite the official legal mechanisms in place for such situations. As a result, loans to public companies might carry more interest than those to public bodies and municipalities.

5.3.2 Practice: lending

Interest rates are not determined solely by the rate of return the bank requires; they are the result of negotiations between lenders and borrowers. We interviewed representatives of BNG Bank[45] on the way interest rates are determined.

The bank builds a so called pricing yield curve by first connecting the funding interest rates for different maturities, based on a formal term structure model, and then adding surcharges for profit and cost (which may depend on principal and maturity), a liquidity premium (if applicable) and a surcharge for cost of capital ("usage of balance sheet"). The exact formula and its parameters are the result of a highly formalized administrative decision procedure that needs approval from the executive board. Before the start of every business day, current interest rates are fed into the system which then automatically provides the bank's client desk with the pricing yield curve.

The purpose of the loans included in this study is immaterial to the bank as credit risk is zero. Moreover, municipalities usually do not borrow for specific projects. Rather, the

[45] Source: interview with the Chair of the Credit Committee of BNG Bank prof. dr. J.J.A. Leenaars 2002-2015.

municipality's treasurer reviews the entire capital needs of his or her organisation and borrows accordingly. Such loans are not lines of credit, though: the principal is lent and paid back according to the agreed amortization schedule.

Actual interest rates are a result of negotiations, usually by telephone or email, between the bank's client desk and the borrower. For the client desk, the pricing curve is exogenous and serves as a reference. It may offer lower rates than this curve suggests in order to attract extra business on days with ample supply, or when the interest rate on the international market has gone down during the day (recall that the pricing yield curve is calculated before the start of every business day). Borrowers aware of the latter are likely to secure better deals than borrowers who do not spend time to collect market information. BNG Bank's client desk for risk-free loans consists of four persons, who share a single office. Three of them were at this client desk during our entire research period; one of them joined it during our research period. Each of them is able to follow negotiations carried out by his or her colleagues. Each of them arranges loans for both municipalities and IOs.

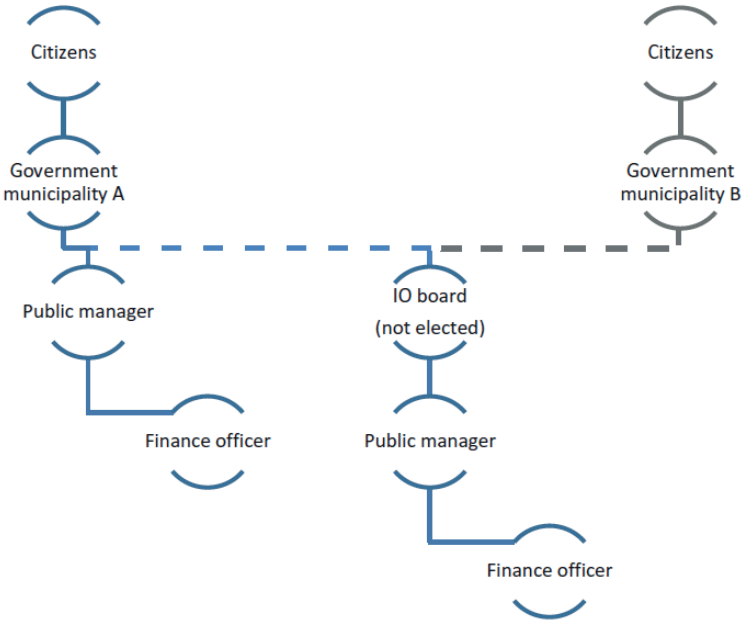
This setup ensures that, on the part of the bank, both types of borrowers are treated in the same way, by the same persons, following the same procedures and using the same pricing curve. Any systematic differences in risk-free interest rates between municipalities and IOs are likely to originate from the borrowers' behavior. Borrowers can obtain somewhat lower interest rates by negotiating well. This requires some general knowledge about credit markets, up-to-data information about current market conditions, and time.

5.3.3 Practice: borrowing

Figure 1 describes the decision making process of borrowing money by municipalities and IOs. Ultimately, municipalities and IOs serve their citizens. Citizens periodically vote to re-elect or dismiss the municipal government. Ceteris paribus, higher costs (e.g., higher interest

rates) result in higher local taxes or less public services (Allers, 2012). Both diminish the local governments' re-election chances, which provides an incentive to operate efficiently. The municipal government delegates day-to-day operations to management, which supervises the finance officer who arranges loans.

Figure 1: Decision-making authority with respect to local government borrowing



In the case of IOs' borrowing, there is an additional link in the chain of command: the general board of the IO. Note, however, that this relationship is not as hierarchical as Figure 1 might suggest, and that it is shared with other municipalities. Its strength may depend on the legal form of the IO. A *public body* is governed by a general board containing members of municipal councils or aldermen from the participating municipalities. It is the general board, not the councils of the participating municipalities, that adopts the public body's budget. This budget determines how much participating municipalities contribute. The municipal councils may express their views on the proposed budget, but they have to accept the public body's

board's decision and authorize payment of the budgeted contributions.

The board managing a *public company* operates even more independently: it enjoys almost complete autonomy vis-à-vis local government (Hulst & van Montfort, (Eds) 2007). The board may (partly) consist of representatives of the participating jurisdictions, but they must act in the interest of the company and are not accountable to the municipal councils.

5.4 Theory and hypotheses

The delegation of decision-making authority introduces the problem that, due to asymmetric information and divergent interests, agents will not automatically act in the best interests of their principals. Figure 1 shows in effect a series of principal-agent relationships, with the citizen as principal, the finance officer as agent, while elected officials and public managers act both as principals and as agents. Agency theory assumes agents to have a negative utility for effort and a positive utility for money. It describes how a control system of monitoring, sanctions and rewards (referred to as "monitoring") is needed to align the agent's objectives with those of the principal e.g., (Fama & Jensen, 1983). In our case, monitoring applies to the oversight on finance officers who arrange loans, but also on public managers, who are responsible for hiring competent finance officers; etc. Less monitoring will result in less effort by the agent.

Optimal monitoring requires trading off costs and benefits. Adding an additional hierarchical layer increases monitoring costs while leaving benefits unaffected. This suggests that persons arranging IO loans are monitored to a lesser extent than those arranging municipalities' loans; the same applies to their bosses (Figure 1). A second reason to expect less monitoring is the fact that the municipal governments' grip on the IO's board is weaker than the grip on its own staff, which raises monitoring costs. IOs operate with a considerable degree of independence,

and financial problems are ultimately shifted to the participating municipalities.

To make matters worse, agency theory suggests an additional problem: dispersed ownership (Sørensen, 2007). Public services provided through IOs are financed from a common pool; hence, the costs are shared with other municipalities. Consequently, when a municipality decides on the amount of effort (cost) that should be put into monitoring an IO, it will take into account that any efficiency gains from putting in that effort will only partly benefit the municipality itself, since they will be shared with all other participants (free rider problem). This is likely to result in a level of monitoring that is lower than that for the operations of the municipality itself.

The public choice literature, however, provides a different perspective, assuming that citizens are unable to effectively oversee their elected representatives. This allows politicians to collect rent: they can divert public resources to further their own goals, e.g., to improve their chances of being reelected. In our case, it could be attractive for politicians to obtain campaign contributions from banks in exchange for higher interest rates on loans. Decision making in IOs is further removed from politicians than decision making in municipalities, and more different politicians are involved. As a result, it is more difficult for a particular politician to exploit the organisation's resources and transaction costs are higher (Sørensen, 2007). This could result in lower interest rates for IOs.

Thus, theoretically, intermunicipal cooperation may result in lower efficiency because of reduced monitoring (agency theory), and to higher efficiency because of less political meddling (public choice). The net effect is uncertain. Marvel and Marvel (2007), using US data, found that the level of monitoring for services provided by other governmental organisations is lower than that for the operations of the municipality itself. We expect the same for our case. Here, political meddling seems to be less relevant than in other settings. As a publicly held company, BNG Bank never makes donations to politicians or organisations

involved in campaigns. Indeed, the only donations BNG Bank makes are to the BNG Culture Fund, an independent organisation which donates to cultural projects selected by experts in the field. This arrangement, and the small amount available for distribution (one million euro per year, while there are over 400 municipalities), make political interference in interest rates on loans from BNG Bank very unlikely. Thus, we hypothesize that intermunicipal cooperation reduces monitoring effort and therefore leads to higher interest costs.

Hypothesis 1.

IOs pay higher interest rates than municipalities on equivalent loans.

Higher interest rates paid by IOs would not necessarily point to inefficient borrowing practices. Because public companies can go bankrupt and municipalities and public bodies cannot, lenders could charge the former higher interest rates in order to cover possible legal or administrative costs of enforcing a loan guarantee. Then, higher interest paid by public companies would not be the result of inefficient borrowing practices. Defaults of public companies are exceptional in the Netherlands. Moreover, officials of BNG Bank we interviewed[46] told us that the costs of retrieving a loan in such a case are negligible.

Hypothesis 2.

Public companies do not pay higher interest rates than public bodies.

If hypothesis 2 is accepted, we conclude that IOs could pay less interest. However, this would require more effort (collecting market information; negotiating). Only if the benefits of putting in this extra effort exceed the costs can we conclude that IOs borrow inefficiently.

Hypothesis 3.

[46] Source: interview with the Chair of the Credit Committee of BNG Bank prof. dr. J.J.A. Leenaars 2002-2015.

Benefits of extra bargaining effort by IOs would exceed costs.

Accepting hypotheses 1, 2 and 3 would suggest that IOs borrow inefficiently. The question then arises why that would be the case. As described above, agency theory suggests three possible reasons for reduced monitoring, and, thus, less efficiency in IOs: the introduction of extra hierarchical layers, the limited influence of municipality governments on IO boards; and dispersed ownership of IOs.

We test the validity of the last explanation by investigating whether interest rates increase with the number of participants in an IO. Several papers argue that inefficiency due to common pool effects increases with the number of participants, a phenomenon called the "law of 1/n" (Weingast, 1979; Primo & Snyder, 2008). In the case of a particular municipality putting effort into monitoring an IO, the share it receives of the gains from that effort are proportional to 1/n.

Although empirical findings supporting the law of 1/n exist in several contexts (e.g., (Baqir, 2002), some authors have raised questions. Primo and Snyder (2008) give examples of cases where a "reverse law of 1/n" may hold. This is in line with Tornell and Lane (1999), who model a situation where each participant has an outside option. This means that, for the most efficient organisation as well as for others, participating must be at least as attractive as leaving. As n goes up, inefficiency must be curbed to satisfy that condition. As municipalities are free to join or leave IOs, this model may be relevant here.

The public choice literature also supports a "reverse law of 1/n". It predicts that decision making in IOs is more efficient because it is further removed from politicians than within municipalities. As the number of participants grows, it gets more difficult for an individual politician to exploit the organisation's resources, as transaction costs are higher.

Thus, theoretically, a higher number of cooperating municipalities may result in lower

efficiency because of reduced monitoring, but also in higher efficiency because of less political meddling and because participants have an outside option. The net effect is uncertain. Earlier in this section we argue that, in our case, political meddling seems to be less relevant. Moreover, as explained, in the Dutch case there are several barriers to leaving an IO. Therefore, we hypothesize that the first effect dominates.

Hypothesis 4.

The interest rate paid by IOs increases with number of participating municipalities (i.e. the "law of 1/n" holds).

Accepting hypothesis 4 implies that dispersed ownership (partly) explains why IOs pay higher interest rates than municipalities.

Amalgamation might also affect monitoring effort. Amalgamation is an arduous process that may have severe disruptive effects on managerial behavior and organisational outcomes, e.g., because of poor staff morale, loss of managerial expertise due to increased turnover, and work overload (Andrews & Boyne, 2012). On the other hand, amalgamation might have a beneficial effect on efficiency. Existing organisations usually have well established ways of doing things, which might have become outdated. Amalgamation forces organisations to reconsider procedures and operations, possibly resulting in more efficient practices (Hansen, Houlberg, & Pedersen, 2014). Again, the net effect is uncertain. We hypothesize that the first, efficiency-reducing, effect dominates, but that it is smaller than for cooperation:

Hypothesis 5a.

After amalgamation, municipalities pay higher interest rates than not (recently) amalgamated municipalities.

Hypothesis 5b.

Interest rates paid by recently amalgamated municipalities are lower than those paid by IOs.

5.5 Method and data

Our units of observation are individual loans. We have data on four types of loans with fixed interest rates made by BNG Bank, which is the market leader in this field:

1) Short term loans (up to one year); principal and interest are due at maturity.
2) Long term loans where amortization and interest is paid in equal installments (Annuity).
3) Long term loan where the principal is paid back in equal installments (Linear).
4) Long term loans where the principal is paid back at maturity (Bullet).

Purchase or sale of loans, refinancing before maturity is reached, restructuring, consolidation of loans and loans with no fixed interest rate or standard amortization schedules are left out of our dataset. Refinancing at maturity is included. We select loans to municipalities and public bodies, and loans to public companies which are guaranteed by municipalities. All loans in our sample are officially free of credit risk.

Interest rates vary a lot over time and over amortization schemes. In order to compare interest rates of different loans, we relate them to reference interest rates that apply to the same dates and amortization schedules. Our dependent variable is the interest rate differential (IRD), defined as the relative difference between the actual interest rate r_j on loan j and the reference interest rate r_{ref}: $IRD_j = \frac{r_j - r_{ref}}{r_{ref}}$. By using a relative measure, we automatically control for macro-economic factors influencing interest rates. The IRD may be interpreted as follows: if, e.g., IOs have an average IRD that is 0.05 higher than that of municipalities, then, other things being equal, they spend 5 percent more on interest payments.[1]

We use the interest rate indicated by BNG Bank's pricing yield curve as the reference interest rate. As explained, this reference rate is exogenous to the staff manning the bank's client desk. For long term loans, reference rates based on the bank's pricing yield curve are available for the most common maturities only: both 5 and 10 years for bullet loans, 5, 10, 15, 20 and 25 years for loans with linear amortization and 10, 15, 20 and 25 years for loans with annuity amortization. We select loans for which reference rates are available, and exclude loans with less common maturities from our main analysis. We also exclude outliers (observations with an IRD above 0.25 or below -0.25). An extensive sensitivity analysis shows that these choices do not affects results (see the appendix of this chapter).

We have data for 1997–2013. For short term loans, however, data is available for 2006-2013 only. For each loan, we have data on the identity of the borrower and on the loan characteristics that influence interest rates. In our regressions, we use principal, maturity, market volatility and forward start (number of days between contract and start of the loan) as controls, and we run separate regressions for different amortization schedules. Market volatility is measured as the coefficient of variation of the reference interest rate in the previous ten business days. In order to allow for non-linearity, we also include the square of these variables. Furthermore, we include year dummies to control for nationwide factors influencing IRDs.

Data taken from the bank's administration are combined with data we collected through a survey of IOs: number of participating municipalities, field of activity and legal form. These characteristics are subject to change over time (Gradus, Dijkgraaf, & Wassenaar, 2014). We define number of partners as equal to 1 in case of loans to municipalities and equal to the number of participating municipalities for loans to IOs.

We use two dummy variables for amalgamation: one indicating whether a municipality has been amalgamated in the year of the loan or up to 3 years before, and one indicating whether

it has been amalgamated 4-8 years before the loan was made. Thus, we can distinguish short run effects from long term effects of amalgamation.

Table 1 presents descriptive statistics. Our dataset contains 11,301 observations, of which 10,307 are loans to 433 different municipalities, and 994 are loans to 113 different IOs. In those 113 IOs, 389 different municipalities participate, ranging from very small to very large.

Table 1
Summary statistics

	(1) N	(2) mean	(3) st.dev	(4) min	(5) max
Entire sample					
Interest rate	11,301	2.093	1.922	0.050	6.820
Principal (million euro)	11,301	7.665	12.25	0.091	278.495
Maturity (years)	11,301	5.972	8.411	0	25
Forward start (days)	11,301	25.32	129.4	0	2,193
Number of partners	11,301	1.543	2.400	1	35
Volatility	11,301	0.012	0.009	0.001	0.088
IRD	11,301	-0.012	0.084	-0.250	0.250
IOs					
Interest rate	994	1.684	1.561	0.090	5.620
Principal (million euro)	994	4.911	8.273	0.010	66.086
Maturity (years)	994	3.782	6.502	0	25
Forward start (days)	994	15.59	74.20	0	923
Number of partners	994	7.178	5.539	2	35
Volatility	994	0.012	0.010	0.001	0.088
IRD	994	0.027	0.072	-0.248	0.250

5.6 Empirical results

5.6.1 Do IOs borrow inefficiently?

Table 2 shows regressions of IRDs on a dummy that takes the value of one if the loan was made to an IO, and on a number of control variables.[2] The first column includes all loans in our dataset. Columns 2-5 concern specific types of loans. In many cases, the control variables are highly significant, especially for long term loans which are more heterogeneous than short term loans. Overall, the included variables explain differences in IRDs quite well.

Figure 2. Summary of hypothese tested.
Note: test outcomes are printed in black, discarded options in gray

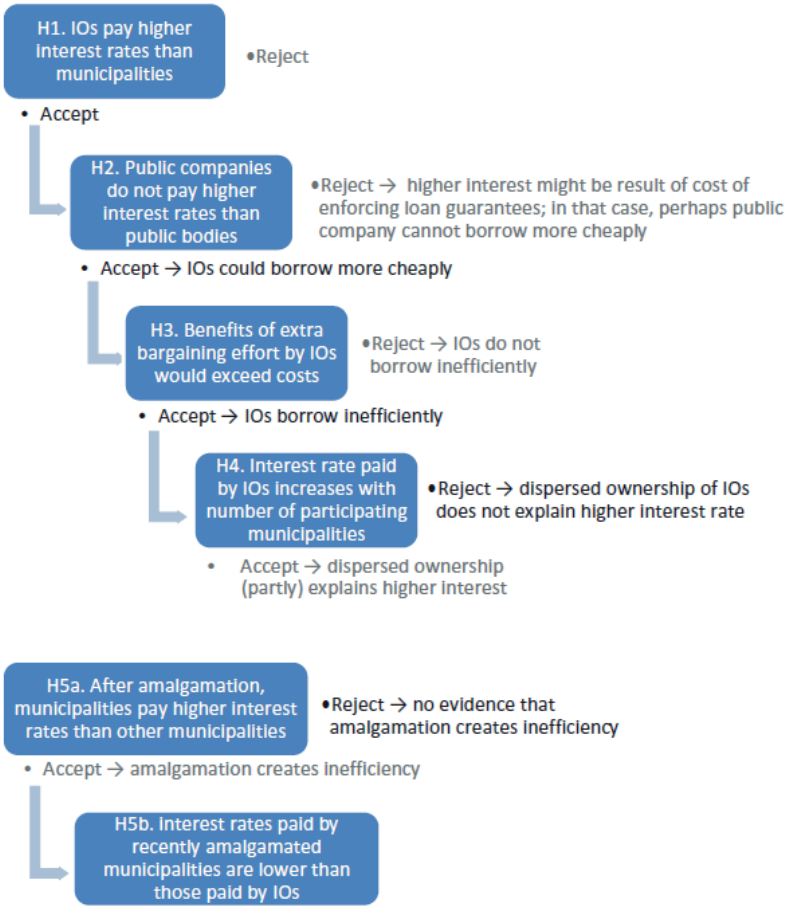


Table 2
Regressions of interest rate differential (IRD): basic analysis

	(1) All loans	(2) Short term	(3) Annuity	(4) Linear	(5) Bullet
IO	0.0432***	0.0475***	0.0464***	0.0271***	0.0438***
	(0.00405)	(0.00536)	(0.00981)	(0.00329)	(0.00836)
Principal (million euro)	-0.000815**	-0.000869*	-0.000855	-0.000607***	-0.000609**
	(0.000398)	(0.000502)	(0.000778)	(0.000155)	(0.000244)
Principal squared	3.21e-06	3.32e-06	2.55e-05	6.25e-06***	3.44e-06
	(3.02e-06)	(3.35e-06)	(2.23e-05)	(2.05e-06)	(3.75e-06)
Maturity (years)	-0.00201***	-0.00544	-0.00886***	0.00191***	
	(0.000559)	(0.0138)	(0.00293)	(0.000658)	
Maturity squared	5.99e-05***	0.00394	0.000248***	-5.52e-05***	4.04e-05
	(1.72e-05)	(0.00863)	(8.27e-05)	(1.88e-05)	(4.41e-05)
Volatility	0.464	0.582*	0.289	0.775***	0.806
	(0.297)	(0.350)	(1.624)	(0.206)	(0.633)
Volatility squared	3.707	3.801	7.457	-18.72***	-26.97
	(6.810)	(7.658)	(56.88)	(5.128)	(16.55)
Forward start (days)	0.000208***	0.00176	0.000212***	0.000194***	0.000338***
	(1.38e-05)	(0.00142)	(1.47e-05)	(1.38e-05)	(4.43e-05)
Forward start squared	-5.93e-08***	-5.34e-05	-6.76e-08***	-4.57e-08***	-2.06e-07***
Observations	11,301	6,822	306	3,673	500
R-squared	0.210	0.165	0.717	0.697	0.678

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Year dummies included.

We now turn to the central question of this paper: do IOs pay higher interest rates than municipalities? The answer is quite straightforward. The coefficients of the IO dummy are positive and highly significant for all loan types. IOs pay 3-5 percent more interest on equivalent loans. This confirms hypothesis 1.

Higher interest rates paid by IOs do not necessarily point to inefficient borrowing practices. Recall that public companies can (and sometimes do) go bankrupt and public bodies cannot. Thus, lenders might want to charge the former higher interest rates in order to cover costs associated with enforcing loan guarantees in case of default. In that case, the higher interest paid by public companies would not be the result of inefficient borrowing practices. One might even argue that our result that IOs pay higher interest rates may be driven partly or wholly by this reason. We now test hypothesis 2, stating that interest rates paid by public companies are not higher than those paid by public bodies.

Table 3 presents regression results for IOs only. As extra control variables we add dummies

representing the fields in which IOs are active. That is because in some fields, a particular legal form or number of participants is more prevalent than in others. The control variables concerning individual loan characteristics (shown in Table 2) are included as well, but we do not report their coefficients.

Our dataset does not contain any annuity or bullet loans to public companies (see Table A1 in the appendix of this chapter), which explains the blanks in those columns. For short term loans and for linear loans, the coefficient of the dummy variable public body is close to zero and far from significant. That means that we observe no difference in interest rates compared with public companies. Thus, we cannot reject hypothesis 2. IOs pay higher interest rates while there is no economic reason to do so.

Table 3
Regressions of IRD of IOs

	(1) All loans	(2) Short term	(3) Annuity	(4) Linear	(5) Bullet
Legal form: public body	0.00241	0.00297		0.00609	
	(0.0120)	(0.0139)		(0.0125)	
Inverse of number of partners (1/n)	-0.0318	-0.0172	-0.658	-0.0146	0.0176
	(0.0384)	(0.0590)	(5.101)	(0.0272)	(0.101)
Field: welfare provision	-0.0220	-0.0165	0.0891	-0.0548***	
	(0.0186)	(0.0208)	(0.972)	(0.0136)	
Field: work provision for disabled	-0.00725	0.00472	-0.0384	-0.0348***	-0.0227
	(0.00944)	(0.00996)	(2.907)	(0.0108)	(0.0271)
Field: environmental services	0.00840	0.0246**	0.0996	-0.0184	0.0253
	(0.0105)	(0.0100)	(0.997)	(0.0138)	(0.0478)
Field: public health	-0.00656	-0.0151		-0.0150	0.0746
	(0.0130)	(0.0241)		(0.0159)	(0.0743)
Field: public safety	-0.0103	-0.00711	-0.153	-0.0371***	-0.0377**
	(0.0142)	(0.0213)	(1.718)	(0.0118)	(0.0152)
Field: business development	0.0119	0.0136			-0.0219
	(0.0184)	(0.0202)			(0.0213)
Observations	889	631	25	197	36
R-squared	0.098	0.084	0.959	0.408	0.978

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Controls (see Table 2) and year dummies included
Observations where legal form is unknown are excluded

Thus, presumably, IOs could pay less interest, but no doubt this would require more effort (collecting market information; negotiating). Only if the benefits of putting in this extra effort exceed the costs (hypothesis 3) can we conclude that IOs borrow inefficiently. A simple

calculation can put this into perspective. For IOs in our sample, average loan size is 4.9 million euro and average interest rate 1.7 percent (Table 1). Thus, yearly interest paid on the average loan is 83,000 euro. Paying 3-5 percent more in interest means paying 2,500 – 4,000 euro more annually. Over 3.8 years (average maturity, Table 1) that amounts to 10,000-15,000 euro per loan (present value, calculated using average interest rate in sample). Assuming wage costs of 100,000 euro (which is generous) and 228 working days per year (the Dutch average), 10,000 euro buys 23 days of staff. Thus, spending an extra couple of hours or even days in order to secure a lower interest rate would be a very profitable investment. Hypothesis 3 is supported. IOs borrow inefficiently.

5.6.2 Is dispersed ownership part of the explanation?

Agency theory suggests three possible reasons for reduced monitoring, and, as a result, less efficiency in IOs: the introduction of extra hierarchical layers as a result of cooperation, the limited influence of municipality governments on IO boards; and dispersed ownership of IOs (common pool problem). If dispersed ownership would contribute to inefficiency, we would expect interest rates to increase with the number of participants in an IO (hypothesis 4). This is tested in Table 3. In our dataset, the number of participants (n) varies from 2 to 35 (Table 1). In order to directly test the "law of 1/n", we include 1/n in the regressions. In each column, the coefficient is far from significant.

Thus, our evidence does not support the "law of 1/n". This implies that it is cooperation as such that results in higher interest rates, not the number of parties involved.

5.6.3 Effect of amalgamation

We now investigate whether amalgamation affects interest paid by municipalities. In Table 4, the regressions in Table 2 are extended with two amalgamation dummy variables. The

coefficient of none of these is significant for any of the loan types. Municipal amalgamation does not affect IRDs, neither in the short run nor in the long run. Using a different cut-off for our amalgamation dummies, or using or a linear amalgamation variable instead (number of years since amalgamation), does not change our conclusions (not reported).

Table 4
Regressions of IRD on cooperation and amalgamation

	(1) All loans	(2) Short term	(3) Annuity	(4) Linear	(5) Bullet
IO	0.0426***	0.0464***	0.0482***	0.0271***	0.0438***
	(0.00421)	(0.00563)	(0.00926)	(0.00331)	(0.00835)
Amalgamated 0-3 years before	-0.00312	-0.0113	0.0141	0.00138	0.000783
	(0.00586)	(0.00982)	(0.00998)	(0.00124)	(0.00439)
Amalgamated 4-8 years before	-0.00455	-0.00764	0.000849	-0.000354	-0.000157
	(0.00480)	(0.00780)	(0.00456)	(0.00144)	(0.00348)
Observations	11,301	6,822	306	3,673	500
R-squared	0.210	0.166	0.720	0.697	0.678
	Only municipalities that participate in IOs included in regressions				
IO	0.0400***	0.0438***	0.0532***	0.0267***	0.0441***
	(0.00471)	(0.00638)	(0.00952)	(0.00328)	(0.00910)
Amalgamated 0-3 years before	0.00108	-0.00566	0.0209*	0.00165	1.90e-05
	(0.00709)	(0.0109)	(0.0121)	(0.00138)	(0.00624)
Amalgamated 4-8 years before	-0.00393	-0.00650	0.00236	0.000336	0.00493
	(0.00559)	(0.00839)	(0.00522)	(0.00188)	(0.00386)
Observations	8,711	5,405	233	2,735	338
R-squared	0.213	0.173	0.760	0.690	0.666

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Control variables (see Table 2) and year dummies included.

Thus, hypothesis 5a, which states that amalgamation temporarily leads to higher interest rates, is rejected. Moreover, this confirms hypothesis 5b, that amalgamated municipalities have lower IRDs than IOs.

5.7 Sensitivity analysis

It might be argued that the decision to cooperate may not be independent of a municipality's efficiency. E.g., efficient municipalities could be less likely to cooperate because they already enjoy low costs, or more likely to cooperate because they are more attractive partners. Then,

we would be comparing IOs, which comprise relatively (in)efficient municipalities, with a group of both inefficient and efficient municipalities. As we have seen, however, the IOs included in our database have participants from 389 different municipalities, while the total number of municipalities was 572 in 1997 and 408 in 2013. Thus, the majority of municipalities participate in the IOs we study. Still, as a robustness check, in the lower panel of Table 4, we include only municipalities that participate in at least one of the IOs we study. The results are very similar to those in the upper panel of Table 4.

Five additional sensitivity tests are detailed in the appendix of this chapter. First, we re-run regressions, now including uncommon maturities for which no reference interest rates are available, using interpolated values for reference interest rates. Secondly, we use a random effects model instead of an ordinary least squares (OLS) specification. Furthermore, we allow previously excluded outliers with an IRD above 0.25 or below -0.25 in our regressions, and apply different thresholds. Additionally, we test whether our results are driven by big municipalities able to secure cheap loans because of a superior bargaining position. Finally, we check whether results are robust to our choice of control variables. The sensitivity analysis shows that our results are quite robust.

5.8 Conclusion

Local government size is the subject of a lively debate. Municipalities sometimes seem too small to be able to perform all tasks that are nowadays expected from them, to benefit from scale economies, or to avoid interjurisdictional spillovers. Such problems may be addressed through national reforms, e.g., amalgamating small jurisdictions into bigger ones, or promoting intermunicipal cooperation in fields where scale matters most. In some cases, local governments operating on a small scale can themselves make a choice between amalgamation and intergovernmental cooperation. Ideally, the choice of jurisdiction size and the extent to

which local governments cooperate should be guided by a comprehensive trade-off of costs and benefits. Efficiency effects are, of course, only part of this trade-off. Many different aspects need to be considered, e.g., the effect of jurisdiction size on the quality of the democratic process (Denters, Goldsmith, Ladner, Mouritzen, & Rose, 2014). Still, efficiency is an important subject, as many local governments struggle to make ends meet. This paper applies a novel methodology to shed light on the implications of intermunicipal cooperation and amalgamation for operating efficiency.

Econometric research on the effects of intermunicipal cooperation on costs is scarce and focused on one particular service: solid waste collection. We choose a different approach, comparing the price Dutch IOs, amalgamated municipalities and not-amalgamated municipalities pay for an identical commodity: risk-free credit. We find that IOs pay significantly higher interest rates.

The higher interest paid by IOs cannot be explained by possible legal or administrative costs associated with enforcing guarantees on loans to public companies. That is because there is no significant difference in interest rates on loans to public companies (which may default, but which borrow under guarantee from the participating municipalities) and public bodies (which, under Dutch law, cannot default). Thus, there is no economic reason why IOs should be required to pay higher interest rates than municipalities.

Interest rates are the outcome of a bargaining process, which is costly. It requires general knowledge about credit markets and up-to-date information about market conditions. If the cost of extra bargaining effort would exceed the benefit from somewhat lower interest rates, IOs would not be borrowing inefficiently, even though interest rates could be reduced. We show, however, that this is not the case. The benefits of lower interest rates outweigh the extra bargaining cost they would require by a wide margin. Consequently, we interpret the higher interest paid by IOs as a form of inefficiency.

The outcome that cooperation reduces efficiency is consistent with agency theory, but not with public choice theory. Agency theory predicts that less monitoring of employees and managers reduces efficiency. There are three reasons to expect that monitoring of IO staff and operations is looser than in municipalities: the introduction of extra hierarchical layers as a result of cooperation, the limited influence of municipality governments on IO boards; and the fact that IOs are owned by a group of municipalities (dispersed ownership), which might create a free rider problem.

If it is dispersed ownership that drives our results, we would expect the number of partners in an IO to affect the interest rate. With more participants, a smaller part of any efficiency improvement benefits a particular municipality, reducing the incentive to put effort into monitoring the IO. However, we find that the number of participants does not affect the interest rate paid by an IO. Our outcomes do not support the "law of 1/n". That does not necessarily mean that dispersed ownership does not create a free rider problem, however; there might be a different effect working in the opposite direction, leaving a zero net effect. E.g., it might be necessary to curb inefficiency in IOs with more participants, to prevent the most efficient partners leaving the IO. Still, our result implies that it is cooperation as such that results in higher interest rates, not the number of parties involved. This leaves the introduction of extra hierarchical layers as a result of cooperation and the limited influence of municipality governments on IO boards as the most probable explanations. Attempts to improve IO efficiency may be targeted on these issues.

Amalgamation, we find, does not lead to higher interest rates. Not even in the short run, where one might suspect the amalgamating process to divert time and effort from operational processes.

Of course, interest is only one of many costs, and not the most important one. We use interest as an indicator, a "canary in a coalmine", because controlling for individual loan

characteristics enables a clean comparison between municipalities and a broad range of IOs. Further research is needed to investigate whether municipal cooperation creates inefficiencies that extend beyond paying higher interest rates. If higher interest costs in IOs are indeed caused by insufficient monitoring, as suggested by agency theory and our results, we would expect inefficiencies elsewhere in IOs, too. Such inefficiencies should be compared with possible gains resulting from economies of scale in order to determine the net effect of cooperation on efficiency. As noted, the results of previous studies of the effects of Intermunicipal cooperation are mixed. It would be interesting to apply our method to countries where these effects already have been studied in a different way, and compare the outcomes.

Notes

[1] More precisely, if the IRD of IOs exceeds the IRD of municipalities by x, the former pay $x\frac{r_{ref}}{r_{municip}}$ as much in interest. That is because $IRD^{IO} = IRD^{municip}$+x implies $\frac{r_{IO}-r_{ref}}{r_{ref}} = \frac{r_{municip}-r_{ref}}{r_{ref}} + x$. Rewriting yields $\frac{r_{IO}-r_{municip}}{r_{municip}} = x\frac{r_{ref}}{r_{municip}}$. As the average value of $\frac{r_{ref}}{r_{municip}}$ in our sample is 1.02, this factor will usually be negligible. Thus, if we find a difference in IRD of 0.05, that implies that 5.1 percent more is paid on interest ($0.05 \times 1.02 \times 100\%$).

[2] Reported standard errors are robust for heteroscedasticity and for correlation between observations for identical organisations.

Appendix

This Appendix contains material that could not be incorporated in the paper because of limited space availability. Section 1 gives a detailed description of our sample. Section 2 describes the treatment of outliers. Section 3 provides a sensitivity analysis.

Detailed sample description

Table A1

Number of observations by amortization schedule

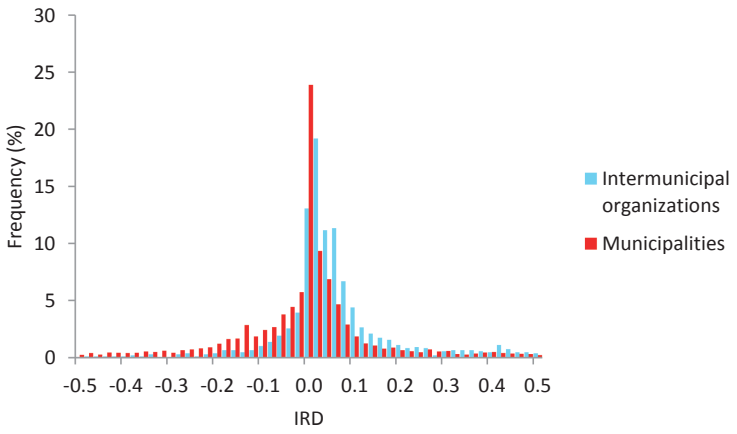
	All loans	Short term	Annuity	Linear	Bullet
IO	994	698	28	231	37
Municipality, amalgamated 0-3 years before	640	289	23	309	19
Municipality, amalgamated 4-8 years before	915	530	19	326	40
Municipality, not recently amalgamated	8,752	5,305	236	2,807	404
Total	11,301	6,822	306	3,673	500
		IOs: field of activity			
Welfare provision	41	36	2	3	0
Work provision for disabled	529	404	3	116	6
Environmental services	70	37	5	27	1
Public health	43	19	0	21	3
Public safety	98	29	16	47	6
Business development	120	115	0	0	5
Other	93	58	2	17	16
Total	994	698	28	231	37
		IOs: legal form			
Public body	799	553	25	185	36
Public company	90	78	0	12	0
Unknown	105	67	3	34	1
Total	994	698	28	231	37

This Table describes the observations used in regressions reported in Tables 2-4, i.e., excluding observations with an absolute value of IRD exceeding 0.25 and excluding observations with uncommon maturities.

Treatment of outliers

Figure A1 shows the frequency distribution of IRDs for municipalities and for IOs. Although most observations are in the range [-0.1, 0.1], the distribution exhibits long tails on both sides. That might be problematic, e.g., in case these result from data errors, especially if systematic differences exist between municipalities and IOs. To investigate this, we accessed the paper files of the ten loans with highest IRDs and the ten loans with lowest IRDs, both for short term loans and for long term loans, and both for municipalities and for IOs, i.e., 80 loans in total.[47] Table A2 summarises the results. For long term loans, a forward start is the most common reason for an extremely high IRD (six out of ten cases, for both municipalities and IOs). In two cases, this coincided with a price guarantee, where IOs pay extra to secure the right to borrow at a certain IRD in a certain period. A small loan size may also result in a high IRD, as the administrative costs of making a loan are fixed.

Figure A1. Frequency distribution of IRDs for municipalities and for IOs (percentages)



One high IRD was the result of a mistake made by the client desk of the bank, and three outliers proved to be data errors (in the computerized data we use). For long term loans, the

[47] For each loan, BNG Bank creates a paper file and a record in its computer system.

reason for very low IRDs is, apart from one data error, that the bank sometimes offers interest rates below the reference rate given by the pricing yield curve, e.g., when market rates drop during the day (the pricing curve is fixed before business starts, early in the morning).

For short term loans, small loan size and obtaining a price guarantee explain most of the very high IRDs; there was one data error. Very low IRDs are caused by large loan sizes, mistakes made by the bank's client desk, and, in two cases, a borrower with a strong bargaining position. In these cases, the representative from the IO which took up the loan had recently negotiated cheap, big loans for a municipality, and demanded the same low IRD, which the bank accepted. This example nicely illustrates the existing bargaining room.

The only systematic difference between municipalities and IOs we find among these outliers is that the latter sometimes pay a premium in order to get a price guarantee. This is not observed in our dataset, so we cannot control for it in. In most cases, outliers are related to forward start and loan size, which we do control for. However, the number of data errors is rather high among outliers. To avoid results driven by outliers, we exclude observations where the absolute value of IRD exceeds 0.25 from our main analysis. In our sensitivity analysis, we will check whether our results are robust for dropping or changing this threshold.

Table A2

Explanations for IRD outliers

	Municipality	IO
	Long term loans	
High IRD		
Forward start	6	6
Small loan	0	4
Price guarantee	0	2
Mistake (too high interest rate offered & accepted)	1	0
Data error	3	0
Low IRD		
Low rate offered because of market conditions	10	9
Data error	0	1
	Short term loans	
High IRD		
Small loan	9	0
Price guarantee	0	9
Data error	1	1
Low IRD		
Big loan	10	6
Mistake (too low interest rate offered)	0	2
Strong bargaining position borrower	0	2

Sensitivity analysis

We test the robustness of the findings of the paper in five ways. First, we re-run regressions, now including uncommon maturities for which no reference interest rates are available, using interpolated values for reference interest rates. Secondly, we use a random effects model instead of an ordinary least squares (OLS) specification. Furthermore, we allow previously excluded observations with an IRD above 0.25 or below -0.25 in our regressions, and apply

different thresholds. Additionally, we test whether our results are driven by big municipalities able to secure cheap loans. Finally, we check whether results are robust to our choice of control variables.

Because reference interest rates for long term loans are only available for common maturities, we excluded observations with other maturities from the main analysis. In order to check whether this has affected our results, we now include all maturities. To find the reference interest rates for non-common maturities, we linearly interpolate the reference rates that are available. E.g., we find the reference rate for a 12 year loan by interpolating the rate for a 10 year loan and that of a 15 year loan. For relatively short terms, we interpolate between the 1 year Euribor rate and the lowest available swap reference rate.[48] For long term loans, over 10 years for bullet loans and over 25 for other long term loans, we use the reference rate for 10 years and 25 years, respectively. Table A3 presents the results of regressions similar to those in Table 4, but including observations with non-standard maturities. Columns 2 of both tables are identical, because reference rates are available for all short term loans. The R-squared values are somewhat lower in Table A3, which is not surprising as our method of interpolating and extrapolating reference interest rates is rather crude (yield curves not normally being linear). The coefficients of the IO dummy are hardly affected, though, nor is their significance. Now, we do find a significant effect of amalgamation, but only in the short-term, and only for bullet loans. We conclude that our basic results are hardly affected by exclusion of loans with non-standard maturities.

[48] To make long term loans, BNG Bank borrows money on the international capital market. The proceeds of the bonds issues, paying a fixed interest rate, are swapped to Euribor (European inter-bank offered rates) immediately to mitigate interest risk. Short term funding is obtained through the money market. Short term lending rates are based on Euribor rates, long term lending rates are based on swap rates.

Table A3

Regressions of IRD with observations with interpolated reference interest rates included

	(1) All loans	(2) Short term	(3) Annuity	(4) Linear	(5) Bullet
IO	0.0422***	0.0464***	0.0420***	0.0292***	0.0509***
	(0.00380)	(0.00563)	(0.00872)	(0.00303)	(0.00644)
Amalgamated 0-3 years before	-0.00106	-0.0113	0.0148	0.00117	0.0188**
	(0.00513)	(0.00982)	(0.0107)	(0.00151)	(0.00934)
Amalgamated 4-8 years before	-0.00247	-0.00764	0.00417	-0.000865	0.0160
	(0.00466)	(0.00780)	(0.00503)	(0.00162)	(0.00981)
Observations	12,637	6,822	445	4,118	1,252
R-squared	0.209	0.166	0.589	0.650	0.454

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Controls and year dummies included.

So far, we used OLS to estimate our models. However, our data has a panel structure: we have 546 organisations (municipalities and IOs) which took out 11,301 loans. Using OLS assumes that there are no significant differences across organisations, except for those reflected in the variables included in the regression. If such differences do exist, however, a random effects model would be appropriate.[49] Breusch-Pagan Lagrange multiplier tests for random effects confirm that this is the case for regressions of short-term and linear loans in Tables 2, 3 and 4. For annuity and bullet loans, on the other hand, the null hypothesis of zero variance across organisations cannot be rejected. As a robustness test, we use a random effects model to re-estimate the regressions in Table 2. The outcomes hardly differ from those

[49] Note that a fixed effects model cannot be used because the loan characteristics we are most interested in, i.e., whether the borrower is a municipality or an IO, are time-invariant and would consequently be wiped out by the fixed effects.

based on OLS estimates (see Table A4). Similarly, using random effects would change Tables 3 and 4 only slightly (not reported, results available from the authors).

Table A4

Regressions of IRD: random effects model

	(1) All loans	(2) Short term	(3) Annuity	(4) Linear	(5) Bullet
IO	0.0443***	0.0577***	0.0464***	0.0242***	0.0462***
	(0.00346)	(0.00544)	(0.00981)	(0.00313)	(0.00949)
Observations	11,301	6,822	306	3,673	500
Number of borrowers	554	418	114	456	169
R-squared within model	0.207	0.150	0.632	0.707	0.590
R-squared overall model	0.207	0.162	0.717	0.693	0.676
R-squared between model	0.377	0.318	0.693	0.563	0.670

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Controls and year dummies included.

In order to prevent outliers from influencing our results, we excluded observations with an IRD above 0.25 or below -0.25 from our regressions. We now test whether our conclusions change if we include these observations, or if we instead set a lower threshold. Table A5 shows results of regressions similar to those in Table 2, reporting only the coefficients of the IO dummy and the number of observations. Column 1 presents coefficients from regressions where observations with extreme IRDs are not excluded. Column 2 presents coefficients from the main analysis as reported in Table 2, excluding IRDs above 0.25 or below -0.25. Including extreme observations strongly increases the coefficient for short term loans, while the coefficients for the other loan types are hardly affected. In Columns 3–5, we exclude observations with an absolute IRD above 0.15, 0.10 and 0.05, respectively. Obviously, the

coefficients are downwardly affected, but they stay positive and highly significant in all cases. Thus, our results are not driven by IRDs of a specific magnitude.

One might worry that our main result is driven by differences in bargaining power of municipalities and IOs *vis a vis* banks. At first glance, that does not seem to be a problem. If municipalities had more bargaining power, IOs would be better off to let the participating municipalities borrow, and transfer the money to the IO through extra contributions. Remember that IOs determine their own budgets, which include such contributions. Still, some municipalities might have more bargaining power than others. Most municipalities and, as far as we are aware, practically all IOs always use banks when they need credit. However, some large municipalities sometimes issue bonds or use auctions to obtain credit. For small organisations, these are not feasible options because of the fixed costs attached to them. Thus, large municipalities might, because they have more alternatives, be able to secure better deals on bank credit. In addition, large municipalities may have better financial-management capacity (Simonson et al. 2001).[50] We now test whether this might have driven our result that municipalities borrow cheaper than IOs. In the regressions underlying Tables 2 and 4, we added a dummy variable for big municipalities (results available upon request). We used different cut-offs to construct this dummy, but in none was this dummy anywhere near significant for any of the loan types we study. More importantly, including such a dummy affects regression outcomes only very marginally.

[50] Simonsen, B., Robbins, M.D., Helgerson, L. (2001). The Influence of Jurisdiction Size and Sale Type on Municipal Bond Interest Rates: An Empirical Analysis, Public Administration Review, 61, 709-717.

Table A5

Regressions of IRD with observations with absolute value of IRD above threshold dropped

	(1)	(2)	(3)	(4)	(5)
	No threshold	IRD<=0.25	IRD <=0.15	IRD <=0.1	IRD <=0.05
			All loans		
IO	0.120***	0.0432***	0.0312***	0.0207***	0.0103***
	(0.0360)	(0.00405)	(0.00262)	(0.00190)	(0.00106)
Observations	14,216	11,301	9,956	8,853	6,814
			Short term loans		
IO	0.156***	0.0475***	0.0319***	0.0188***	0.00633***
	(0.0448)	(0.00536)	(0.00335)	(0.00243)	(0.00124)
Observations	9,695	6,822	5,569	4,593	3,035
			Annuity		
IO	0.0455***	0.0464***	0.0381***	0.0383***	0.0215***
	(0.00979)	(0.00981)	(0.00962)	(0.00887)	(0.00485)
Observations	309	306	289	264	227
			Linear		
IO	0.0295***	0.0271***	0.0269***	0.0223***	0.0158***
	(0.00439)	(0.00329)	(0.00323)	(0.00263)	(0.00164)
Observations	3,701	3,673	3,612	3,525	3,152
			Bullet		
IO	0.0428***	0.0438***	0.0402***	0.0305***	0.0217***
	(0.00885)	(0.00836)	(0.00724)	(0.00393)	(0.00370)
Observations	511	500	486	471	400

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Controls and year dummies included.

Finally, we investigate whether our choice of control variables affects outcomes.[51] Leaving out year dummies hardly affects results. Including only year dummies as controls results in a somewhat stronger effect of the IO dummy on IRD, as is to be expected. Changing the time period we use to construct our volatility measure or including the square root or the inverse of control variables instead of the square does not make much of a difference.

We conclude that the sensitivity analysis shows that our results are quite robust.

[51] Regression results are not reported. They are available from the authors.

6 Choosing the optimal moment to arrange a loan[52]

SNGs who take loans have limited possibilities to minimise borrowing costs. They mainly depend, aside from some room for bargaining, on the loan offers from banks and on market conditions. One subject that is much discussed in the financial departments of SNGs is whether an optimal moment to arrange a loan can be found, aiming to lock in the best interest rate. Lower borrowing costs could lead to more room to finance public services. We test different strategies for borrowers who may choose, within a 20-day time slot, the moment to arrange a loan. The strategy that is most successful in minimising the interest rate does not use historical data, but starts by observing interest rates for a number of days, and then chooses the day with an interest rate that compares favorably. However, differences in outcomes of the strategies are too small to matter much. Organisational or behavioral motives to choose a particular borrowing strategy should be decisive.

6.1 Introduction

In cases where credit is needed, this need is usually known well in advance. Existing loans coming to maturity that need to be refinanced; funds needed for investment projects; in no well-managed organisation any of this will come as a surprise. This provides borrowers the option to choose the moment when a loan is arranged. Instead of waiting until the funds are needed, a loan can be arranged earlier, using a so-called forward start. This means that there is a time lag between the contract date, i.e., the date the loan is arranged and the interest rate set, and the date the funds are made available.

To illustrate that forward starts are quite common, we present some statistics from a dataset of

[52] This chapter is based on van Ommeren, B. J., Allers, M. A., & Vellekoop, M. H. (2017). *Choosing the optimal moment to arrange a loan (no. 17007-EEF).* University of Groningen, Research Institute SOM (Systems, Organisations and Management).

loans of BNG Bank to Dutch municipalities and intermunicipal organisations in 1997-2015.[53] Because of the exceptionally high creditworthiness of Dutch municipalities, one phone call or email suffices to secure a loan that starts the same day.[54] This unique Dutch setting is explained in more detail in Chapter 2 and Chapter 3. However, we find that 65 percent of these loans have a forward start. 33 percent of the loans have a forward start of less than 10 days. However, the maximum is a staggering 2,193 days (about 6 years). The average forward start, counting the zeroes, is 71 days; the median is 2.

Forward starts may have different motivations. First, a forward start may appeal to risk-averse borrowers. By arranging the loan as soon as the need for capital has become clear, a cost increase as a result of rising interest rates is prevented. A second reason is that loans may have to be approved at meetings of high-level officials that take place with intervals; e.g., as part of a budget for a project. If, e.g., money is needed in six weeks' time and meetings where a loan can be approved are held monthly, a forward start of several weeks is to be expected. Finally, and most relevant for this paper, a forward start may be chosen by a borrower who expects the interest rate to rise. By arranging the loan now, at the current rate, the loan will be cheaper - provided the borrower was right.

Figure 1 shows the relative decrease in the benchmark interest rate between contract date and loan start in the BNG Bank dataset. Loans represented by dots below the zero line have become cheaper as a result of the forward start; loans represented by dots above the zero line have become more expensive. In fact, gains and losses seem to cancel out; the linear trend line in the Figure (not shown) coincides with the zero-line. On average, loans have become 0.1 percent (not percent point) cheaper as a result of forward starts. There is a wide variation,

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[53] The dataset contains bullet loans with maturities of 5 and 10 years, annuity loans with maturities of 10, 15, 20 and 25 years, and linear loans with maturities of 5, 10, 15, 20 and 25 years.

[54] All loans in our dataset are risk-free. Dutch municipalities do not default, as a result of an explicit bailout clause enshrined in the law (Allers, 2015). The loans to intermunicipal organisations included in the dataset are risk-free because municipalities guarantee them.

however; the effect of a forward start ranges from 50 percent cheaper to 43 percent more expensive, as shown in Figure 1.

Figure 1. Relative benchmark interest rate decrease between contract and start of loan (percent).

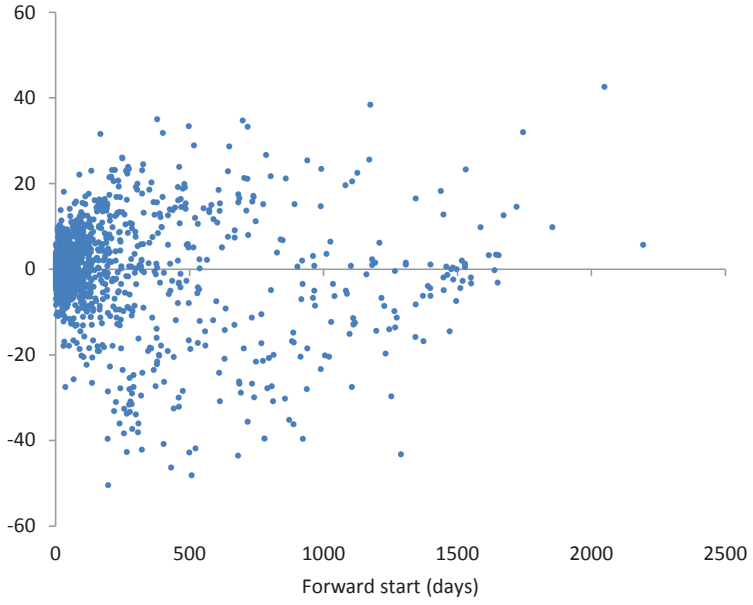


Figure 1 does not point to clear cost savings as a result of forward starts, but, as we have seen on the previous page, that may not always have been the objective. The question presents itself whether successful timing strategies exist that borrowers may use in order to secure relatively cheap loans. Perhaps knowledge of previous interest rates may help select the best date to fix the interest rate.

Efficient markets theory does not predict that short-term interest rates follow a random walk (Mishkin, 1978; Pesando, 1979). However, in the absence of time-varying term premiums, long-term interest rates approximately follow a martingale series when observed over a short period (Sargent, 1976; Pesando, 1979). Thus, the best prediction of tomorrow's interest rate is today's interest rate, even if all previous interest rates are known. This theoretical insight is supported by a number of studies that present advanced methods to predict bond rates, but

often fail to beat the random walk model (Fauvel, Paquet, & Zimmerman, 1999; Baghestani, 2009).

Of course, efficient markets theory relies on assumptions, some of which may not hold. In particular, the assumption that economic agents behave rationally is problematic, as it is not applied in a systematic way (LeRoy, 1989). Indeed, there exists an entire industry producing financial predictions. If these would have no value, buyers in this market would behave irrationally.

Even if we accept the random walk as the best model to predict tomorrow's interest rate, however, an effective strategy to find a low interest rate in a pre-determined time interval is not a priori impossible. E.g., in times of high volatility, it may pay to wait for a day with an interest rate that is lower than those in the previous days. Thus, perhaps information about previous interest rates can help select the best moment to arrange a loan.

What we have here is a so-called optimal stopping problem, where an irreversible choice must be made under uncertainty and within a finite time horizon (Peskir & Shiryaev, 2006; Allaart, 2012). A well-known example is the secretary problem (Ferguson, 1989), where the best secretary must be selected from n applicants. The applicants are assessed successively, and after each assessment the candidate is either chosen or dismissed. A dismissed applicant cannot be called back. The interviewers are able to rank all assessed applicants, but have no information at all about candidates who are not (yet) assessed. The optimal decision rule (an approximation that becomes closer as n increases) is to dismiss the first n/e candidates, and then select the applicant who is better than the best candidate up to that point. In case a better candidate does not turn up, the n-th candidate is chosen.

Our case differs from the secretary problem because data about previous interest rates is

available. This means that is it not necessary to use part of n to gather information. In this paper, we consider a number of simple strategies that can be applied without expert knowledge or high cost. We test whether each of these strategies would have been successful in the previous two decades. Obviously, no conclusions can be drawn from this about the success of these strategies in the future.

This analysis is socially relevant, as finding strategies that keep borrowing costs low leaves financial room for more public facilities. The academic relevancy of this study lies in the comparison of different borrowing strategies with optimal stopping strategies (Peskir & Shiryaev, 2006; Allaart, 2012) and more in particular that of the 'secretary problem' (Ferguson, 1989). It is not clear whether and to what extent this solution also holds for finding the optimal time to arrange a loan.

6.2 Problem definition

In order to conduct empirical tests, the problem must be defined clearly. Assume that a loan has to be arranged regularly. Each time, on day d = 1 it becomes known that, on day d = 20 at the last, a certain amount of credit must be available. The interest rate varies from day to day (and not during the day, we assume). Data about interest rates on previous days is available. The challenge is to find a strategy that selects, within the decision period of 20 days, the day with the best interest rate. With days we mean office days; days on which a loan can be arranged.

It is not obvious how the performance of a strategy should be measured. We consider four possible objectives to measure the success of a particular strategy. The first objective is: maximise the number of times that the strategy selects the lowest interest rate of all interest rates within the decision period. This is the objective in the secretary problem. An important drawback of this objective is that, in most cases, the lowest interest rate will not be selected,

in which case this objective does not maximise the interest rate that is chosen. Our second objective does not have this limitation: it aims at choosing the lowest expected interest rate of all interest rates within the decision period. That is, it aims to select the lowest interest rate *on average* for all loans.

The drawback of this objective is that interest rates in different periods cannot always be fruitfully compared, because the market rate can change significantly over time. The third objective circumvents this, by aiming to get the best ratio of the selected interest rate and the lowest interest rate within the decision period.

For risk-averse borrowers, however, this will probably still be unsatisfactory. That is because a strategy may be successful on average, but have greatly varying outcomes. In that case, it may work out rather disappointingly in a particular case. The fourth objective therefore aims to minimise the variation in the selected interest rate (as measured by the standard deviation). This objective may be used next to either objective 1, objective 2, or objective 3.

6.3 Strategies

We study five classes of strategies.

Strategy 1(k) is to look back passively during a reference period of k days, k = 1..20. The lowest interest rate from that period is taken as the reference rate. Strategy 1(8), e.g., is to wait for a day when the interest rate is lower than or equal to the lowest rate in the 8 days preceding d = 1, and then arrange the loan. Strategy 1a is to wait until the interest rate is *strictly* lower than the reference rate. If no lower interest rate comes before the last available day, the loan is arranged on d = 20.

Strategy 2(k) is to look back actively for k days, k = 1..20. On each day within the decision period, which runs from d= 1 to d = 20, one looks back to the k days preceding that day. The

lowest interest rate from that reference period is the reference rate. The difference with strategy 1 is that the set of k reference days is shifted one day towards the future on every day within the decision period, while this set is fixed in strategy 1. Strategy 2 is to arrange the loan as soon as the interest rate is equal to or lower than the reference rate. Strategy 2a is to wait until the interest rate is strictly lower than the reference rate. Again, if no (strictly) lower interest rate materializes, the loan is arranged on day 20.

Strategy 3(k) is to first determine the drift (difference in interest rate) between k days before d = 1 and d = 1, for k = 1..20. If the drift is positive, the loan is arranged immediately (d = 1). If the drift is negative, one waits for d = 20 to arrange the loan. Thus, this strategy compares interest rates on two days only.

Strategy 4(k) follows the classic secretary approach. No historic data are used. Instead, k days are used to observe interest rates, k = 1..20. The lowest rate within this period is the reference rate. The loan is arranged as soon as the interest rate is equal to or lower than (or strictly lower than, strategy 4a) the reference rate, or, if such an interest rate does not appear between day k and day 20, at the last day.

Strategy 5(d) is the simplest: always choose a fixed day d to arrange the loan. E.g., always select d = 1, d = 7 or d = 20.

More formally, we define strategies according to the following stopping moments:

$$\tau_1^k = \min\{d = 1 \ldots 20 \mid r_d \leq \min_{1 \leq j \leq k} r_{1-j}\} \qquad \tau_{1a}^k = \min\{d = 1..20 \mid r_d < \min_{1 \leq j \leq k} r_{1-j}\}$$

$$\tau_2^k = \min\{d = 1 \ldots 20 \mid r_d \leq \min_{1 \leq j \leq k} r_{d-j}\} \qquad \tau_{2a}^k = \min\{d = 1..20 \mid r_d < \min_{1 \leq j \leq k} r_{d-j}\}$$

$$\tau_3^k = 1_{r_1 \geq r_{1-k}} + 20\, 1_{r_1 < r_{1-k}} \qquad \tau_{3a}^k = 1_{r_1 > r_{1-k}} + 20\, 1_{r_1 \leq r_{1-k}}$$

$$\tau_4^k = \min\{d = k+1 \dots 20 \mid r_d \leq \min_{1 \leq j \leq k} r_j\} \quad \tau_{4a}^k = \min\{d = k+1 \dots 20 \mid r_d < \min_{1 \leq j \leq k} r_j\}$$

$$\tau_5^k = k$$

where r denotes interest rate. If no stopping time is found, day 20 is selected.

6.4 Empirical research

We test these strategies using historical benchmark interest rates from BNG Bank, with different maturities and different amortization schemes, from January 2, 1997 up to December 31, 2015. BNG Bank is the Dutch market leader in credit to (quasi) public organisations like municipalities, IOs, water authorities and housing corporations. Benchmark interest rates are used by the bank in negotiations with clients requesting a loan (Allers & van Ommeren, 2016). Benchmark rates are based on Euribor for short term loans and on swap rates for long term loans, and contain surcharges for profit, cost and liquidity. The benchmark rate, which depends on amortization pattern and maturity, is derived before the start of every business day by feeding the current market interest rates into an automated system.

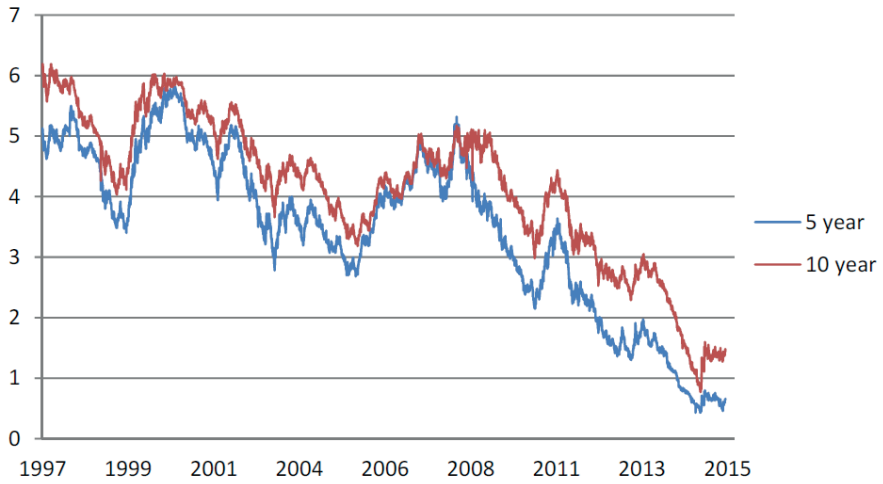
Interest rates on loans with a forward start are usually higher, because pricing is based on immediate borrowing by the bank, on the capital market, until maturity, and lending to a third party against a usually lower rate for the period until the loan starts. The resulting loss in the first period has to be compensated by a premium on the interest rate during the second period, leading to a higher interest rate. The forward start surcharge depends on maturity, length of forward start and interest yield structure. For forward starts up to 20 day, this surcharge is low; approximately one basis point (0.01 percent point).[55] In the empirical analysis we

[55] Cost neutrality for the bank implies: $(1+Rn)^n = (1+Rd)^d * (1+Rf)^{n-d}$. Here, Rf is the forward interest rate of a loan starting at year d and ending at year n; Rn denotes the current interest rate for loans with a maturity of n years; Rd the current interest rate for loans with a maturity of d years. Solving this equation for Rf yields $Rf = \left(\frac{(1+Rn)^n}{(1+Rd)^d}\right)^{\frac{1}{n-d}} - 1$. Substituting the average benchmark interest rates for Rd (20 days) and Rn (both 5 and 25 years) in our data period yields a forward start surcharge of 1.6 and 0.5 basis points, respectively. Of

therefore abstract from this. In our discussion of the results we will come back to the forward start surcharge.

We apply every strategy on each of the 238 consecutive series of 20 office days that existed within our data period. The strategies are tested for bullet loans with maturities of both 5 and 10 years, and for linear loans with maturities of 10, 15, 20 and 25 years, because for such loans, benchmark interest rates are available. Bullet loans are loans where the principal is paid back at maturity. Linear loans are loan where the principal is paid back in equal installments. With both loan types, interest on outstanding debt is paid annually.

Figure 2. Benchmark interest rates for 5 year and 10 year bullet loans, 1997-2015.



We plot the outcomes in graphs which are organized in four rows and four columns. Each row corresponds to a strategy; however, strategy 5 is shown in every row (black* lines). Each column corresponds to one of the four objectives described above. Figure 3 presents the results for bullets loans with 5-year maturity. The other loan types we studied yield similar results; they are available in the appendix to this chapter.

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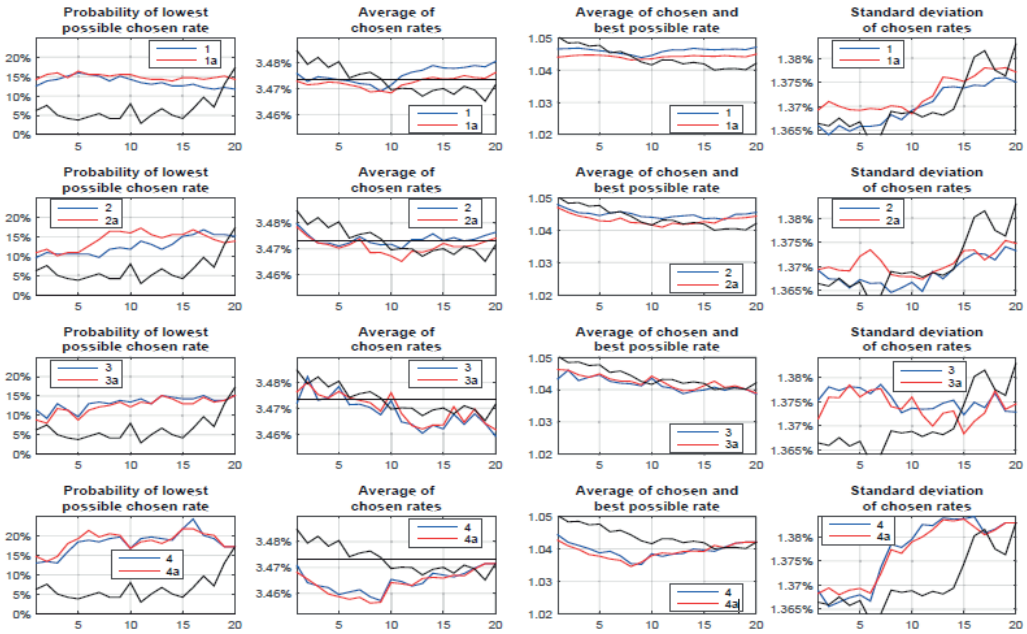
course, banks are free to deviate from this theoretical surcharge, e.g., by adding a profit margin, or by not bothering to apply a surcharge for short-term forward starts at all.

The first column shows, for each strategy, in what percentage of cases the lowest interest rate from all interest rates within the decision period is selected. On the horizontal axis is k, the length of the reference period. For strategy 5, which does not have a reference period, d is on the horizontal axis. A value of 15 for a k of 8 denotes, e.g., that this strategy, using a reference period of 8 days, selects the lowest interest rate 15 percent of the time. In this column, higher means better.

Column 2 presents, for each strategy, the average of the selected interest rates. The horizontal black lines in this column show the average benchmark interest rate in the research period.

Column 3 presents the ratio between the selected interest rate and the lowest of all interest rates within the decision period. Column 4 shows the standard deviation of the selected interest rate (in percent point) over all 238 periods of 20 working days within our research period. In columns 2, 3 and 4, lower means better.

Figure 3: Simulation results for bullet loans with 5- year maturity



6.5 Results

Table 1 summarises the results for bullet loans with a maturity of 5 years. With objective 1, which maximises the percentage of cases where the lowest interest rate from all interest rates within the decision period is selected, strategy 4, the secretary approach, is optimal, with k = 16. Note that this k is higher than the theoretical optimum of n/e, which approximately equals 7.[56] Recall that this theoretical optimum is an approximation, which is better with high values of n. Also, interest rates may not necessarily appear in random order, which is one of the assumptions underlying this approximation. Using strategy 4(16), in 24 percent of all cases, the lowest available interest rate was selected (Table 1). The second-best strategy is 5(20): always arrange the loan at the last possible moment. This yields the best interest rate in 17 percent of all cases. This strategy is relatively successful because, in the research period (1997-2015), the interest rate went down more often than it went up. The difference in outcome between the best performing strategy and the second-best is 7 percent point, whereas the difference between the best and the worst performing strategy, 5(11), is 21 percent point.

Table 1. Best and second-best strategy per objective; 5-year bullet loans

Objective	Best strategy	Result (%)	Second-best strategy	Result (%)	Worst strategy	Result (%)
1 Most often lowest rate	4(16)	24.4	5(20)	17.2	5(11)	2.9
2 Lowest rate on average	4a(8)	3.456	3(20)	3.459	5(1)	3.485
3 Lowest $\frac{\text{selected rate}}{\text{best actual rate}}$	4a(8)	103.5	3(20)	103.9	5(1)	105.0
4 Lowest standard deviation	5(6)	1.363	1(2)	1.364	4(16)	1.384

With objective 2, selecting the lowest rate on average, the secretary approach is best as well; this time, waiting until the interest rate is strictly lower than the reference rate (strategy 4a) is slightly better than waiting until it is equal to or lower than the reference rate (strategy 4). The optimal k equals 8, which is close to the theoretical optimum of the secretary problem; recall,

[56] Here, e is the base of the natural logarithm, approximately 2.72.

however, that this theoretical optimum pertains to objective 1. Strictly speaking, with objective 2, strategy 4 is second best (Figure 3), but because 4 and 4a are close variations on a theme, we include 3(20) as second best in Table 1. This strategy implies arranging the loan immediately in case of positive drift, and waiting as long as possible in case of negative drift, with the maximum reference period of k = 20. The difference in outcomes between best and second best is 0.3 basis points (0.003 percent point). The outcome of the worst performing strategy, 5(1), differs 2,9 basis points from that of the best performing strategy.

As explained, objective 3 may be the most relevant for many organisations. This objective minimises the ratio of the selected interest rate and the lowest available interest rate in the decision period. Again, the secretary approach dominates, with k = 8. On average, the selected interest rate was 3.5 percent (not percent point) above the lowest available rate. As with objective 2, strategy 4a is slightly better than strategy 4, and the second best strategy is 3(20). With this strategy, the selected interest rate was 3.9 percent above the lowest available rate.

The good performance of the secretary approach is remarkable. In many cases, it performs better than looking back passively (strategy 1), even though it sacrifices k days of the decision period to collect data, and even though is does not optimise objective 3 but objective 1. Compared with strategies 2, 3 and 5, strategy 4 also performs well for many values of k (until k = 10..15, depending on loan type; see Figure 3 and the Figures in the appendix). Strategy 4 often performs best with objective 1 or 2, too.

Based on objective 4, which minimises the standard deviation of the selected interest rate, strategy 5(6) would be preferred, followed by 1(2) as a second best. Strategy 4 performs tolerably well with this objective, as long as k is below 7. For k = 13-16, on the other hand, strategy 4 has the highest standard deviation of all strategies (Figure 3).

The most important lesson to be drawn from column 4 in Figure 3, however, is that outcomes vary greatly over time. The standard deviation exceeds 100 basis points for every strategy. Differences in standard variations between strategies are relatively limited. Compared to their standard deviations, differences in outcomes of strategies are very small.

As mentioned above, a forward start results in a higher interest rate to compensate the bank for making the funds available before they are needed. For forward starts up to about 20 days, this surcharge is in the order of one basis point. This surcharge should be subtracted from the gains of using a strategy with a forward start, but as we have seen, this cost is negligible compared to the variation in outcomes over time.

6.6 Conclusion

In cases where a borrower may choose, within a limited time slot, the moment to arrange a loan, and thus the moment the interest rate is determined, it is probable not advisable to spend much time on this choice. Based on a comparison of five classes of simple strategies, applied to interest rates from 1997-2015, we conclude that outcome differences between strategies are small, and that the variation in outcomes of each strategy over time is much bigger. One of the strategies we studied, the classic secretary approach, performs better than other strategies in many cases, but the potential gains from using this strategy are dwarfed by the variation of outcomes over time. Thus, for a particular loan, the probability that this strategy performs significantly better than one of the other strategies we considered is very low. Our empirical analysis is based on interest rates from one bank, BNG Bank of the Netherlands, but these are closely related to international market rates.

Because differences in outcomes are small, organisational or behavioral motives to choose a particular borrowing strategy may be decisive. In cases where, e.g., a certain budget has been allocated to a project, it may be sensible to immediately arrange a loan carrying an interest

that fits within the budget, if such a loan is available at that moment. Thus, rising interest rates cannot jeopardize the project. More generally, risk-averse borrowers could decide to always use a maximum forward start, i.e., arrange the loan immediately, while risk-neutral persons could decide to never use a forward start, because then a forward start surcharge on the interest rate is avoided.

However, borrowers who want to use the strategy which just outperformed the other strategies we considered in recent history should go for the secretary approach. This easy to apply strategy promises good results for different maturities and different optimising criteria, while no historical data are needed.

Appendix

Figure A1. Simulation results for bullet loans with 10-year maturity

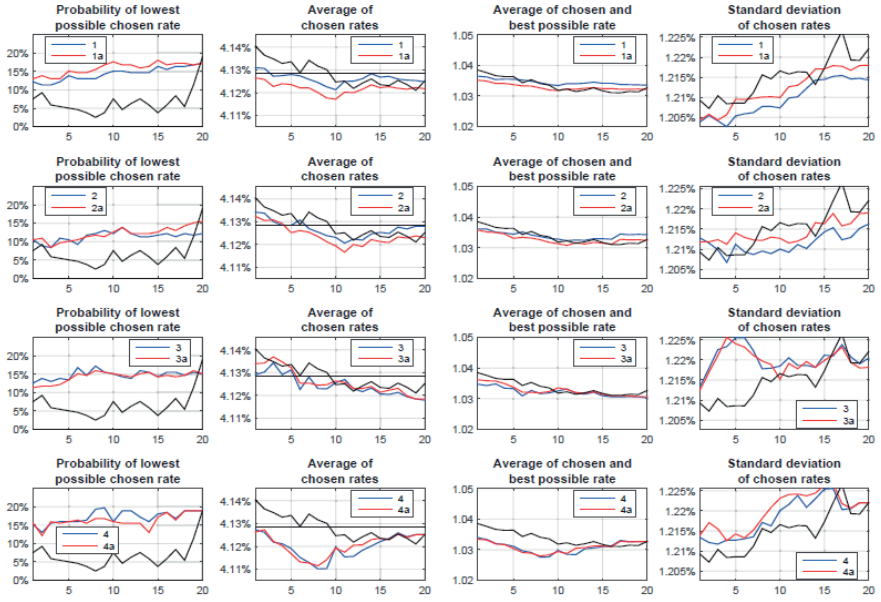


Figure A2. Simulation results for linear loans with 10-year maturity

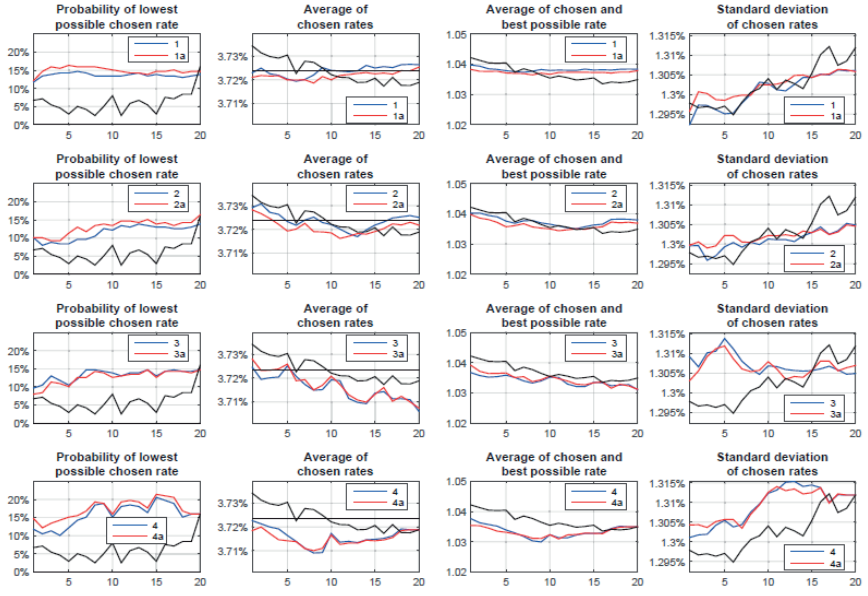


Figure A3. Simulation results for linear loans with 15-year maturity

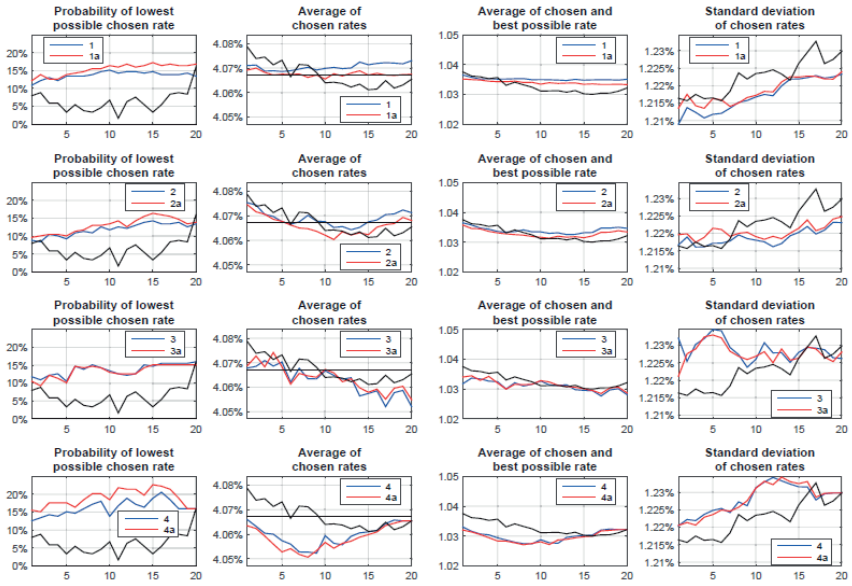


Figure A4. Simulation results for linear loans with 20-year maturity

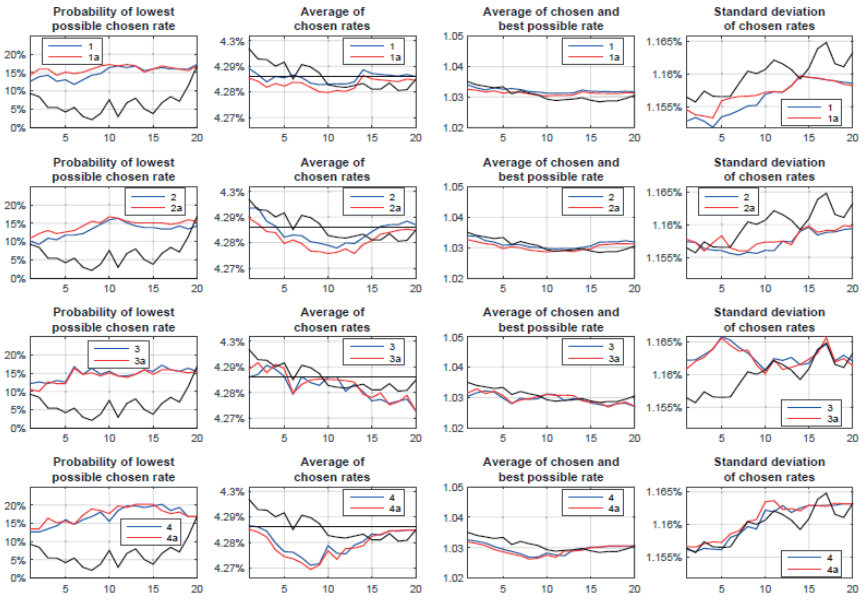
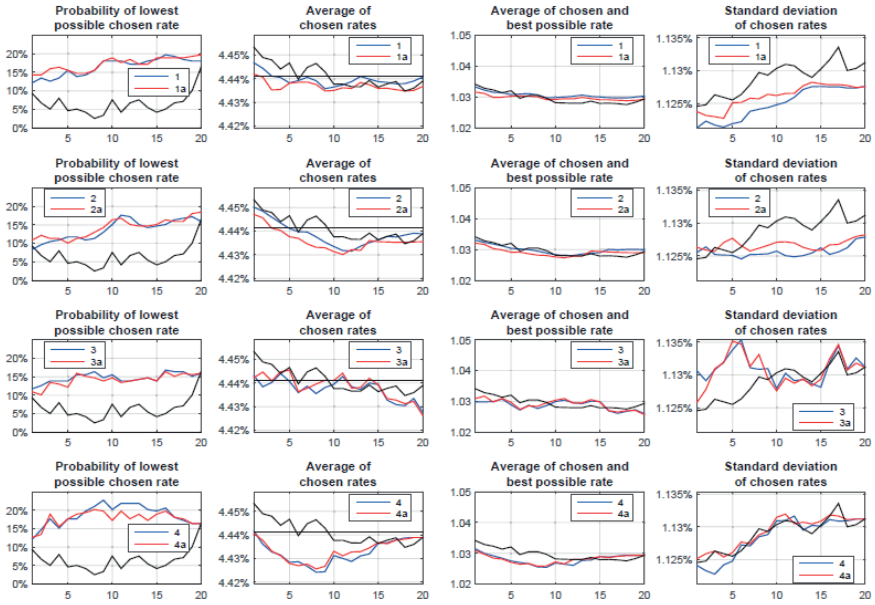


Figure A5. Simulation results for linear loans with 25-year maturity



7 Summary and conclusions

The ongoing decentralisation of the public sector is accompanied by a strong demand for credit at an SNG level to finance investments. To ensure a proper and sustainable implementation of tasks, affordable and reliable sources of credit are of key importance. In Europe, bank loans are by far the most important source of credit for SNGs. In most countries in Europe, public sector banks have been created to facilitate the financial needs of SNGs. Government guarantees are provided, implicitly or explicitly, to lower barriers to credit and to lower interest rates on loans. The Netherlands has put in place explicit government guarantees for municipalities and social housing associations. This phenomenon is typically Dutch and unique in Europe. Other countries are reluctant to provide explicit guarantees because they fear moral hazard. Providing well-designed explicit government guarantees is inextricably linked to an adequate institutional setting and borrowing practice to prevent abuse. One of the key elements of this institutional setting is the limitation on SNG borrowing, which is explained below.

In the Netherlands, SNGs may borrow unlimited amounts within a balanced budget. The budget is accounted for on an accrual basis. According to this standard, costs and expenditures may be incurred that will be accounted for at a later date, conforming to the pay-as-you-use philosophy. As a result of this, the budget may be in balance but at the same time indicate a cash shortage, which needs to be funded with credit to execute the necessary payments, resulting in increasing debt levels. Borrowing within a balanced budget can be achieved as long as the interest on loans and depreciations of investments are covered by the budget. The loan amount and the investment are not part of the budget and are presented on the balance sheet. Dutch SNGs borrow under a form of government guarantee. Because the lack of market forces on the level of interest to be paid, regardless of the level of debt or

economic performance, this could lead to unsustainable debt levels and financial distress. However, in the Netherlands SNGs do not go bankrupt and bailouts seldom occur.

The Netherlands, with its explicit government guarantees, offers a unique opportunity for empirical research. This thesis included three empirical studies, all related to borrowing costs: the first examining the impact of government guarantees on SNG borrowing costs; the second comparing the efficiency of different types of SNGs by measuring the borrowing costs; and the third looking at strategies to lower borrowing costs by finding an optimal moment to arrange a loan. Data from 1997 to 2013 was used for all municipalities and social housing associations to carry out a panel regression. Before turning to a final look at these studies, it should be recalled that for a better understanding of the unique Dutch setting in which municipalities can borrow with explicit government guarantees, in Chapter 2 we clarified the institutional setting in the Netherlands, that is, the tiers of government, the financial institutions and their roles related to municipal borrowing, while in Chapter 3 we described the practice of municipal borrowing with explicit government guarantees, practical issues concerning municipal borrowing and a quantitative description of contracted loans.

7.1 Bailout clauses and borrowing costs (Chapter 4)

An important goal of government guarantees is to make credit available to SNGs at affordable prices and to create a level playing field. This chapter investigated the effects of explicit government guarantees on borrowing costs of housing corporations and municipalities. Four main issues were empirically studied. We addressed the questions of: To what extent do unguaranteed loans have higher interest rates than guaranteed loans? Do we find support for the notion that guarantees (in the Dutch institutional setting) are undesirable with respect to moral hazard? Are differences in the two different guarantee systems (that for housing

corporations and that for municipalities) reflected in interest rates? Does the financial situation of the borrower influence the interest rate on guaranteed and unguaranteed loans?

Firstly, while controlling for other relevant factors, we conclude that the government guarantee substantially lowers interest rates paid by housing corporations by about 72 basis points (i.e. 0.72 percentage points). This could be seen as stating the obvious. However, credibility is not a matter of course, in the first place because unguaranteed loans may benefit from an implicit guarantee with a downward pressure on interest rates. In addition, if the bank assesses the guarantee as not fully credible, it may still charge a risk premium for guaranteed loans. Moreover, differences in interest rates were found in relation to the risk-free reference rates, probably reflecting commercial margins. We found evidence that making a guarantee explicit substantially helps to lower interest rates.

Secondly, the annual benefits of reduced interest payments were compared with the bailout payments to housing corporations. The yearly benefits, in the form of lower interest payments, to the social housing sector amounted to around EUR 610 million. Comparing this with the bailout payments provided to rescue housing corporations (EUR 1.5 billion over 24 years, 1990-2014), it appears likely that the guarantee has had a positive net benefit. This means that the bailout clause would only be undesirable if it led to very high indirect costs, such as, for example, loss of efficiency. We conclude, contrary to the mainstream literature, that such a guarantee is not necessarily undesirable due to moral hazard problems. Of course, the institutional setting and adequate borrowing practice must prevent abuse as much as possible.

Thirdly, we compared two guarantee systems. On the one hand, municipalities are entirely protected from default by law and legislation. On the other hand, for housing corporations, individual loans are protected by a guarantee fund. This means that housing corporations can default on a loan and will be bailed out by the guarantee fund ex post. This may result in extra costs for the bank to collect money due, so that the bank may charge a premium for this. However, we found no differences in interest rates paid by municipalities and housing corporations. This means that the guarantee system for housing corporations is equally successful in lowering interest rates as the one for municipalities. Therefore, we conclude that we can generalise the results for housing corporations to municipalities.

Fourthly, the relevance of the explicit government guarantee is again confirmed by our finding that a housing corporation's financial position (or riskiness) influences interest rates for unguaranteed loans only. This indicates that, in our research period, the bank did not monitor housing corporations when providing guaranteed loans, but relied on the credibility of the bailout clause and the assessment of the supervisory authorities. For unguaranteed loans, however, the bank monitors the riskiness of housing corporations.

We emphasise that we are not arguing that explicit government guarantees are desirable under all circumstances, but rather that they are not undesirable per se.

The research on the bailout clause could gain credibility by extending the datasets. The current research focuses on loans made by one bank, while corporations also borrow substantial amounts of capital from other banks. Also, nearly all unguaranteed loans are short-term loans. This makes it hard to isolate the effect of the bailout, since, in principle,

differences in interest spread could also be due to the loan type. Results could gain credibility if the dataset could be extended by including more long-term unguaranteed loans.

Avenues for further research might include the investigation of guarantee frameworks in other countries and how to optimise the design of guarantees to prevent abuse. Moreover, additional research on the effects of explicit government guarantees and implicit guarantees would be welcome to obtain a better understanding of the borrowing costs. In the mainstream literature, the downside of guarantees is emphasised by focusing on moral hazard issues. It would be helpful to shed more light on the institutional setting and the benefits of guarantees, such as easy access to credit at low costs.

7.2 The efficiency of different types of SNG (Chapter 5)

In many countries, municipalities are seeking opportunities to ensure a more efficient delivery of services. Two possible solutions are municipal amalgamations or cooperation through intermunicipal organisations (IOs). This study applied a novel approach to measure the efficiency implications of this choice by comparing borrowing costs on equivalent loans. Subsequently, in the case of differences, we investigated what might have been the cause. With respect to this, we explored the questions: Do different forms of IOs (guaranteed public companies and public bodies) pay the same interest rates? Does it make sense to invest in bargaining power to lower interest rates? Does the number of participants in an IO influence the interest they pay (a phenomenon called the law of 1/n)? Do recently amalgamated municipalities pay higher interest rates than those which are not recently amalgamated?

Firstly, we found that IOs in the Netherlands consistently pay higher interest rates than municipalities on equivalent risk-free loans. To understand the origin of this difference we

investigated two different forms of IOs, a guaranteed public company and a public body. While a public company can default, entailing possible legal or administrative costs associated with enforcing guarantees on their loans, a public body cannot (under Dutch law). This means that the bank may demand a credit risk premium for loans to public companies. Despite this difference, we found no significant variation in interest rates between public bodies and public companies. Thus, there is no economic reason why IOs should be required to pay higher interest rates than municipalities.

Secondly, interest rates are the outcome of a bargaining process which has its own costs. It requires general knowledge about credit markets and up-to-date information about market conditions. If the cost of additional bargaining efforts exceeds the benefit of somewhat lower interest rates, IOs would not be borrowing efficiently, despite interest rates being reduced. With a simple calculation, we showed, however, that this is not the case. The benefits of potentially lower interest rates outweigh the extra bargaining costs by a wide margin. Consequently, we interpreted the higher interest paid by IOs as a form of inefficiency.

A lower level of monitoring could lead to higher borrowing costs if the absence of rewards or sanctions results in lesser effort to realise the best interest rate for the organisation. Staff of the client desk of a bank also have commercial targets. The interest rate to be set on a loan in this oligopolistic market may vary within small margins (e.g. 10 basis points). This is the result of a bargaining process. The banks keep track of their failure and success rates for loan offers (quotes) at a general level. If many loan offers are rejected this could be a reason to lower the general interest level. These failure and success rates are also recorded at a client level. The client desk is well aware of the nature and the determination of individual clients and will find ways to realise commercial targets. Clients that always accept a first loan offer

or loan offers from the same bank, loyal clients, will end up with a higher interest rate. This higher interest rate could be interpreted as a form of inefficiency because the benefit of extra bargaining efforts exceeds the costs.

Agency theory suggests three possible reasons for reduced monitoring and, thus, less efficiency in IOs: the introduction of additional hierarchical layers; the limited influence of municipality governments on IO boards; and dispersed ownership of IOs. If it is dispersed ownership that drives our results, we would expect the number of partners in an IO to have an effect on the interest rate. With more participants, each municipality gains a smaller part of the benefits of any efficiency improvement, reducing the incentive to put an effort into monitoring the IO. However, we found that the number of participants did not affect the interest rate paid by an IO. Thus, our results did not support the 'law of 1/n'. This does not necessarily mean that dispersed ownership does not create a free rider problem; rather, there might be another effect working in the opposite direction, leaving a zero net effect. For example, it might be necessary to curb inefficiency in IOs with more participants to prevent the most efficient partners leaving the IO. Nevertheless, our result implies that it is cooperation as such that results in higher interest rates, not the number of parties involved. This leaves the introduction of additional hierarchical layers as a result of cooperation and the limited influence of municipality governments on IO boards as the most probable explanations.

Thirdly, we studied the effects of municipal amalgamation – which could also lead to reduced monitoring – on interest rates. However, we found no differences in interest rates between municipalities and amalgamated municipalities, not even in the short run, where one might suspect the amalgamation process could divert time and effort from operational processes.

If insufficient monitoring in IOs is indeed causing higher borrowing costs, as suggested by agency theory and our results, we would also expect inefficiencies elsewhere in IOs.

The research on the efficiency of different types of SNGs could gain credibility by extending the datasets. The current research focuses on loans made by one bank, while SNGs also borrow substantial amounts from other suppliers of money.

Further research is needed to investigate whether IOs create inefficiencies that extend beyond paying higher interest rates. It would also be interesting to apply our method to countries where these effects have already been studied in a different way and compare the outcomes.

7.3 Choosing the optimal moment to arrange a loan (Chapter 6)

SNGs who take loans have limited possibilities to minimise borrowing costs. They mainly depend, aside from some room for bargaining, on the loan offers from banks and on market conditions. One subject that is much discussed in the financial departments of SNGs is whether an optimal moment to arrange a loan can be found, aiming to lock in the best interest rate. Lower borrowing costs could lead to more room to finance public services. Dutch municipalities borrow under a form of government guarantee. Banks do not have to perform complicated credit-risk assessments for these loans. This enables municipalities to arrange loans at very short notice, some even starting the same day. In cases where credit is needed, this is usually known well in advance. For instance, debtors know when loans that are coming to maturity need to be refinanced. This provides debtors with the option to choose the exact moment to arrange a loan. Instead of waiting until the funds are needed, a loan can often be arranged earlier, using a ‘forward starting’ loan. The interest rate is fixed at the moment the loan is arranged. Dutch municipalities often use forward starting loans.

There are several reasons to arrange forward starting loans. Firstly, it may appeal to risk-averse borrowers. Secondly, administrative procedures may be the origin of this choice. Thirdly, and most relevant for this study, speculative reasons, the expectation of higher interest rates, may be the origin of this choice. Forward starting loans may incur a small 'surcharge' to cover the funding costs of the bank for making the funds available at a later date.

This chapter focused on the possibility of lowering interest rates by choosing the optimal moment to arrange a loan within a timeslot of one month (20 working days). We tested this notion by comparing five different classes of strategies, easy to implement at low costs. Three of them made use of historical interest rates. For forward starts of up to one month, the calculated surcharge is low; approximately one basis point (0.01 percentage point).

The strategies

1) The first strategy is a passive strategy: looking back up to one month (20 working days), the lowest interest rate in this period is selected and this interest rate is set as the reference rate for the coming decision period (also 20 working days). The loan is arranged at the moment that the current interest rate is lower than or equal to this reference rate (strictly lower interest rates are indicated by 'a' in Table 7.1). If this does not occur, the loan is arranged on the last possible day.

2) The second strategy is a variation on the first. It is an active strategy, which means that the reference rate is set every new day.

3) The third strategy uses the drift of the market: the positive or negative difference between an interest rate in the past (1 to 20 days) and the rate at the start of the

decision period. If the drift is up, the loan is arranged immediately, if it is down the last possible day is chosen.

4) The fourth strategy follows the classic 'secretary strategy' approach. No historical rates are used; instead, a waiting period is created (1 to 20 days), during which the lowest interest rate is set as the reference rate. The loan is arranged the moment the current interest rate is lower than or equal to this reference rate in the rest of the decision period (20 days minus the waiting period). If this does not occur, the loan is arranged on the last possible day.

5) The last strategy is the easiest: always arrange the loan on the same day in the decision period, e.g., day 1 or day 2, or another fixed day.

The objectives and results

We defined different objectives to measure the results of the strategies:

1) Maximising the probability of choosing the lowest interest rate.

2) On average, the lowest interest rate.

3) The lowest ratio between the chosen interest rate and the lowest rate.

4) Minimising the variation in the selected interest rate (as measured by the standard deviation).

The results of the application of each strategy are presented in Table 7.1 (with the optimal number of days looking back/waiting period in brackets). These results apply to loans with a maturity of five years; other maturities (10, 15, 20 and 25 years) yield similar outcomes.

Table 7.1 Summary of the results for bullet loans with a maturity of five years

Objective	Best strategy	Result (%)	Second-best strategy	Result (%)	Worst strategy	Result (%)
1 Most often lowest rate	4(16)	24.4	5(20)	17.2	5(11)	2.9
2 Lowest rate on average	4a(8)	3.456	3(20)	3.459	5(1)	3.485
3 Lowest $\frac{\text{selected rate}}{\text{best actual rate}}$	4a(8)	103.5	3(20)	103.9	5(1)	105.0
4 Lowest standard deviation	5(6)	1.363	1(2)	1.364	4(16)	1.384

With respect to Objective 1, which maximises the percentage of cases where the lowest interest rate of all interest rates within the decision period is selected, Strategy 4, the secretary approach, is optimal on day 16. Using Strategy 4(16), in 24% of all cases, the lowest available interest rate was selected (Table 7.1). The second-best strategy is 5(20): always arrange the loan at the last possible moment. This objective does not provide information about what is optimised if the lowest interest rate is not selected, therefore, we included the second objective. With this objective, Strategy 4a(8), the secretary approach (a = variant strictly lower) with a waiting period of 8 days, selects on average the lowest interest rate. A shortcoming of this objective is that, as a consequence of volatile interest rates, the results are also driven by market developments. For this reason, we included Objective 3, which is perhaps the most relevant for many organisations.

This objective minimises the ratio of the selected interest rate and the lowest available interest rate in the decision period. For example, a ratio of 103.5 means that when the lowest rate is 4% the expected selected rate will be 4.14%. In the worst case, a difference of 1.5% from the lowest rate of 4% will result, with an expected difference of six basis points (0.06 percentage points). Although a strategy may perform well with an average ratio, this may be the result of volatile outcomes, which increases the risk. Therefore, we also included Objective 4 to identify the strategy with the lowest risk, measured by the standard deviation during the whole research period. The standard deviation for all strategies is beyond 100 basis points, which

could be intertreted as equally risky strategies.

The good performance of the secretary approach for all objectives should be noted. In many cases, it performed better than strategies that set the reference rate based on historical rates. Nevertheless, while the classic secretary approach performed better than other strategies in many cases, the potential gains from using this strategy are dwarfed by the variation of outcomes over time. The differences in results between the strategies were small, on average less than 3 basis points. In addition, we have to deduct the surcharge for the forward start, estimated at 1 basis point. Thus, for a particular loan, we considered the probability that this strategy performs significantly better than one of the other strategies to be very low. Our empirical analysis was based on interest rates from one bank, the BNG Bank of the Netherlands, but these are closely related to international market rates.

We conclude that organisational and behavioural motives to choose a borrowing strategy or a moment to arrange a loan within a limited time (one month) will have no effect on expected financial results. In cases, for example, where a certain budget has been allocated to a project, it may be sensible to immediately arrange a loan carrying an interest rate that fits within the budget, if such a loan is available at that moment. In this way, rising interest rates will not jeopardise the project. More generally, risk-averse borrowers could decide to always use a maximum forward start, that is, arrange the loan immediately, while risk-neutral borrowers might decide to never use a forward start, because they can thereby avoid the forward start surcharge on the interest rate. It is reassuring to know that these motives have a negligible effect on the expected financial results.

However, borrowers who want to use a strategy which has recently proven to outperform

others, should use the secretary approach. This strategy is easy to apply and promises good results for different maturities and different optimising criteria, while no historical data are needed.

The research on choosing the optimal moment to arrange a loan could gain credibility by extending the datasets with market rates and new strategies. The current research focuses on BNG Bank interest rates and five strategies, it would be interesting to know if the results also hold for market rates and other strategies.

Additional research could be conducted, applying ‘optimal stopping’ solutions such as the secretary strategy to other optimisation processes within a limited timeslot. Perhaps these findings could help to improve budgetary decisions.

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Samenvatting (Summary in Dutch)

Inleiding

Over heel de wereld is er een tendens waarneembaar dat nationale overheden in toenemende mate overgaan tot decentralisatie. Dit doen ze om de prestaties van de publieke sector te verbeteren. De achterliggende gedachte hierbij is dat lagere overheden een beter zicht hebben op de lokale voorkeuren en hierdoor de vraag en het aanbod van publieke voorzieningen beter kunnen afstemmen op de behoeften van de burgers. Deze ontwikkeling gaat gepaard met een toenemend beroep op omvangrijke bedragen aan krediet, noodzakelijk om investeringen op lokaal niveau te kunnen financieren. Om deze ontwikkeling op een deugdelijke en duurzame manier vorm te kunnen geven, is de beschikbaarheid van een betaalbare en betrouwbare bron van krediet van cruciaal belang.

Lagere overheden (LO) trekken doorgaans krediet aan door obligaties uit te geven of door bankleningen af te sluiten. In landen buiten Europa wordt voor het aantrekken van krediet door LO met name gebruik gemaakt van de obligatiemarkt. Binnen Europa is de situatie echter anders, hier is de belangrijkste bron van krediet, bankleningen. Om deze middelen tegen lage kosten en goede voorwaarden ter beschikking te kunnen stellen, hebben de overheden in de meeste Europese landen besloten tot de oprichting van publieke sector banken. Deze banken zijn gespecialiseerd in het verstrekken van goedkoop, makkelijk toegankelijk en betrouwbaar krediet aan LO. Om het kredietrisico te elimineren of te verkleinen kunnen overheidsgaranties worden afgegeven, expliciet of impliciet.

Voor de meeste landen geldt dat de hoogst mogelijke kredietrisico garantie, bestaat uit een onvoorwaardelijke garantie die verstrekt is door de nationale overheid. Kredietrating bureau's

zullen nationale instituten en LO normaal gesproken geen hogere rating geven dan de nationale overheid. Indien er een reddingsactie ondernomen moet worden kan de nationale overheid, de garantieverstrekker, gedwongen worden om financieel bij te springen. Een expliciete garantie waarborgt dat de kredietnemer tegen de beste voorwaarden kan lenen, als gevolg van een besluit "vooraf" van de overheid om bij te springen mocht het verkeerd gaan. In het geval van een impliciete garantie besluit de garantieverstrekker achteraf of er een reddingsoperatie zal volgen. In Nederland is er sprake van expliciete overheidsgaranties voor gemeenten en sociale woningbouwverenigingen (woningcorporaties). Dit fenomeen is typisch Nederlands en uniek in Europa. Andere landen zijn terughoudend om expliciete garanties te verstrekken omdat ze moreel wangedrag (moral hazard) vrezen; kredietnemers die meer lenen dan noodzakelijk hetgeen uiteindelijk leidt tot onhoudbare schuldniveaus, als gevolg van het comfort dat de kredietnemer heeft omdat er uiteindelijk toch iemand anders voor de problemen opdraait. Landen die er zo over denken, geven er de voorkeur aan om impliciete garanties te verstrekken. Het verstrekken van goed ontworpen expliciete overheidsgaranties gaat gepaard met een adequate institutionele inrichting en praktische inrichting van het leenproces om misbruik te voorkomen.

Nederland heeft goede ervaringen met haar garantiesysteem. Dit proefschrift onderzoekt het ontwerp van het Nederlandse garantiesysteem en de hieraan onlosmakelijk verbonden institutionele context en de praktische inrichting van het leenproces. Nederland, met haar expliciete garanties, biedt een unieke mogelijkheid om empirisch onderzoek te verrichten. In dit proefschrift zijn drie empirische studies opgenomen die allen betrekking hebben op de rentekosten bij het aantrekken van een lening en twee hoofdstukken die de institutionele inrichting en het leenproces omschrijven. Deze twee hoofdstukken bieden zicht op de unieke Nederlandse context.

Daar waar de meeste landen in Europa impliciete garanties aan LO verstrekken, maakt het interessant om te bezien of en in welke mate, het expliciet maken van deze garanties, de rentekosten kan verlagen. Met het oog hierop onderzoekt onze eerste studie wat de effecten zijn van een expliciete overheidsgarantie op de leenkosten van woningcorporaties en dat van gemeenten. De volgende studie richt zich op het fenomeen dat in veel landen gemeenten de mogelijkheden onderzoeken om diensten meer doelmatig aan te bieden. Twee mogelijkheden zijn schaalvergroting (fuseren van gemeenten) en het aangaan van gemeentelijke samenwerkingingsverbanden (GS). Hierbij kunnen vragen worden gesteld over wat de gevolgen zijn van deze keuzes op de mate van doelmatigheid. De Nederlandse context biedt een compleet nieuwe mogelijkheid om de doelmatigheid tussen gemeenten en gemeentelijke samenwerkingsverbanden te vergelijken. De laatste studie richt zich op de mogelijkheden om een lagere rente te krijgen door een goed instapmoment te kiezen om een lening af te sluiten. Dit is een veel besproken onderwerp op de financiële afdeling van menig gemeente. Hiertoe vergelijken we vijf verschillende strategieën, allen makkelijk te implementeren tegen lage kosten. We onderzoeken of er strategieën zijn die beter presteren dan de andere onder verschillende criteria.

Dit proefschrift draagt op meerdere wijzen bij aan de bestaande literatuur. Om te beginnen, voor zover we hebben kunnen nagaan, is dit het eerste onderzoek dat expliciete overheidsgaranties onderzoekt. Verder zijn er nauwelijks empirische studies te vinden met betrekking tot het financieren van LO met bankleningen. Dit proefschrift voegt hierbij nieuw empirisch onderzoek aan toe. Als laatste noemen we de nieuwe methodiek om de doelmatigheid van verschillende typen van LO met elkaar te vergelijken.

<u>De rationale achter overheidsgaranties</u>

Vanuit de economische literatuur is er veel weerstand tegen garantiestelsels, omdat het

onherroepelijk zou leiden tot moreel wangedrag. Zelfs wanneer er geen expliciete garanties zijn, kan een bank nog steeds verwachten dat er financieel zal worden bijgesprongen (een impliciete garantie), vanuit economische of politieke motieven. Een eventueel bankroet kan gepaard gaan met hoge politieke kosten en een groot verlies aan welvaart. Denk hierbij bijvoorbeeld aan de bouw van een school of een brug waarbij de ontwikkelaar voortijdig failliet gaat. In zo een geval kan de betrokken gemeente alsnog genoodzaakt zijn om het project te finaliseren en te financieren. Er zijn genoeg voorbeelden te noemen dat er tegen de formele afspraken in toch financieel wordt bijgesprongen. Verwachtingen omtrent een mogelijke redding kunnen leiden tot een lagere renteopslag. Anderzijds kunnen gegarandeerde leningen niet geheel geloofwaardig blijken, wat dan weer kan leiden tot een hogere renteopslag. Indien er geen verschil is in renteopslag, kan dit gezien worden als een overbodige garantie waarbij er ruimte blijft bestaan voor moreel wangedrag.
Desalniettemin maken expliciete overheidsgaranties in Nederland een wezenlijk onderdeel uit van het institutionele stelsel bij het lenen door gemeenten en woningcorporaties. Vooralsnog lijkt het Nederlandse garantiestelsel echter prima te functioneren, er hoeven maar zelden reddingsoperaties te worden ondernomen. Het gebruik van expliciete garanties vraagt wel om een adequate, duurzame institutionele inrichting en praktische inrichting van het leenproces. Op deze wijze slaat de balans door van de nadelen van een mogelijk misbruik naar de voordelen van een eenvoudige toegang tot krediet tegen lage rentetarieven. Een ander voordeel van het verstrekken van expliciete overheidsgaranties is dat het de samenleving geen geld hoeft te kosten, zoals bijvoorbeeld subsidies.

Vormen van expliciete overheidsgarantie

De overheidsgarantie in Nederland kan meerdere vormen aannemen. Bij gemeenten is de gehele financiële positie gegarandeerd door wet- en regelgeving waarbij zelfs een financiële

ingebreke stelling uitgesloten is. Zo zijn bijvoorbeeld de financiële verplichtingen, rente en aflossing een verplichte uitgave uit het budget en hebben zo prioriteit op de salarisbetalingen. Als een gemeente in financieel zwaar weer komt, behoedt artikel-12 ervoor, dat de bank geen aanvullende acties hoeft te ondernemen om haar geld te krijgen. Iets anders ligt dit bij de woningcorporaties, zij hebben een waarborgfonds (garantiefonds) dat individuele leningen garandeert. Na een mogelijke ingebreke stelling neemt het waarborgfonds, nadat de bank aanvullende actie heeft ondernomen, de verplichtingen over.

De institutionele inrichting

De institutionele inrichting in Nederland bestaat uit het geheel aan relevante wet- en regelgeving, de verdeling van taken, bevoegdheden, verantwoordelijkheden en geldstromen binnen de verschillende overheidslagen en de daartoe opgerichte instituties, het toezicht en de controle. Dit geheel aan maatregelen is een complex samenspel van deels overlappende wet- en regelgeving en is historisch gegroeid naar wat het nu is. Een institutionele inrichting is dan ook niet makkelijk te kopiëren. Het is wel de institutionele inrichting die in belangrijke mate voorwaardelijk is voor het succes van een garantiestelsel. In hoofdstuk 2 en 3 wordt dieper ingegaan op de unieke Nederlandse context. Eén van de elementen van de institutionele inrichting betreft de mate waarin LO onbeperkt kunnen lenen, dit lichten we hieronder toe.

Hoeveel kunnen de lagere overheden lenen?

In Nederland kunnen LO onbeperkt lenen binnen een sluitende begroting. De begroting wordt volgens de algemeen geldende regels opgesteld in lijn met een baten en lasten stelsel. Dat wil zeggen dat kosten en opbrengsten worden toegerekend aan de periode waar ze betrekking op hebben. Als gevolg hiervan kunnen LO leningen aangaan zelfs als de begroting in evenwicht is. Grote investeringen worden doorgaans gefinancierd met vreemd vermogen. Een sluitende

begroting wordt bereikt zolang de te betalen rente en de afschrijvingen op de investering gedekt worden door de begroting. De lening en de investering maken geen onderdeel uit van de begroting en worden op de balans verantwoord. Dit in tegenstelling tot de rijksoverheid die op kasbasis administreert, hierbij gaat een sluitende begroting niet samen met aanvullend lenen.

Het onderzoek

Het onderzoek is uitsluitend gebaseerd op daadwerkelijk afgesloten leningen en daadwerkelijk betaalde rente op leningen. Deze data is niet publiek beschikbaar. Om ons empirisch onderzoek mogelijk te maken hebben we toegang gekregen tot een dataset van de BNG Bank (de grootste sectorbank in Nederland). We hebben geen vergelijkbare informatie beschikbaar van andere aanbieders van geld. Om deze reden richten we ons uitsluitend op de BNG Bank. Deze dataset geeft gedetailleerde informatie over meer dan 11.000 gemeenteleningen (inclusief gemeenschappelijke regelingen en leningen onder gemeentegarantie) en 6.000 corporatieleningen. Ook wordt in deze dataset, sedert 1997, de dagelijkse renten bijgehouden die indicatief zijn voor gemeenteleningen. De volgende LO zijn betrokken in het onderzoek: gemeenten, gemeentelijke samenwerkingsverbanden en woningcorporaties.

Het eerste onderzoek is getiteld “Expliciete overheidsgaranties en de rente op leningen”, hierbij wordt onderzocht in hoeverre het expliciet maken van de garanties erin slaagt om het kredietrisico te elimineren en de rente te verlagen. Het tweede onderzoek “De doelmatigheid van verschillende typen van LO” maakt gebruik van de unieke Nederlandse situatie van expliciete overheidsgaranties, waarbij de rente op leningen gebruikt wordt om de doelmatigheid te vergelijken tussen gemeenten en gemeentelijke samenwerkingsverbanden. Het laatste onderzoek “Het optimale moment om een lening af te sluiten” onderzoekt of het

hanteren van verschillende strategieën kan bijdragen aan het verkrijgen van een lagere rente.

Expliciete overheidsgaranties en de rente op leningen (Hoofdstuk 4)

Dit onderzoek richt zich op vier hoofdzaken: In hoeverre hebben ongegarandeerde leningen een hogere rente dan expliciet gegarandeerde leningen? Vinden we aanwijzingen dat garanties in de Nederlandse setting onwenselijk zijn en leiden tot misbruik (moral hazard)? Leiden de verschillende garantiesystemen in Nederland, van gemeenten en van woningcorporaties, tot verschillen in de te betalen rente? Spelen de financiële prestaties van de debiteur een rol in de te betalen rente bij het afsluiten van een gegarandeerde lening in een overheidsgegarandeerde omgeving?

Het hanteren van expliciete overheidsgaranties is uniek voor Nederland, andere landen geven bijvoorbeeld de voorkeur aan een impliciete garantie (Duitsland) of geen garanties (Zwitserland). Dit maakt het interessant om de Nederlandse situatie te onderzoeken. Een probleem dat wij bij het onderzoek naar de overheidsgarantie ervaren is dat gemeenten alleen gegarandeerde leningen hebben en we bijgevolg geen vergelijking kunnen maken met ongegarandeerde leningen. Om deze reden hebben we een uitstap gemaakt naar de sociale huisvestingsector. Woningcorporaties kennen zowel expliciet gegarandeerde (door een waarborgfonds) en ongegarandeerde leningen. Om te testen wat de geloofwaardigheid is van de garantie is onderzocht in hoeverre ongegarandeerde leningen een hogere rente hebben dan gegarandeerde. In ons onderzoek vinden we een rentevoordeel van circa 72 basispunten (0.72 procentpunt) als gevolg van het garantiestelsel ten opzichte van een ongegarandeerde lening. Verschillen die gevonden zijn in de te betalen rente op gegarandeerde leningen en de risico vrije referentierenten (de door de BNG Bank gepubliceerde renten) zijn waarschijnlijk te wijten aan commerciële marges. We zien aldus voordelen voor het expliciet maken van een

overheidsgarantie ten opzichte van een ongegarandeerde lening. Echter, voordat we hier iets over kunnen zeggen moeten we eerst naar de negatieve kanten van een garantie kijken om het netto-effect te kunnen bepalen.

Wat betreft de onwenselijkheid van garanties met betrekking tot het moreel wangedrag, hebben we onderzocht in hoeverre de baten van een jaarlijks lagere rente opwegen tegenover de uit te voeren reddingsoperaties (in de corporatiesector gebaseerd op historische gegevens). Het blijkt dat de jaarlijkse baten van 610 mln. euro aan verminderde rentelasten voor woningcorporaties in het verleden ruimschoots hebben opgewogen tegenover de kosten. Deze kosten zijn samengesteld uit de betalingen uithoofde van achtervang aan woningcorporaties, die over een periode van 24 jaar 1,5 mrd hebben bedragen (1990-2014). Het garantiestelsel zou over deze periode alleen nog onwenselijk kunnen zijn als deze tot hoge indirecte kosten zou leiden, bijvoorbeeld als gevolg van een lagere doelmatigheid.

Verder hebben we de twee garantiesystemen met elkaar vergeleken, bij gemeenten waar de gehele financiële positie gegarandeerd wordt door wet- en regelgeving en woningcorporaties waarbij alleen de individuele leningen gegarandeerd worden door middel van een waarborgfonds. We vinden in ons onderzoek geen verschil in renten die woningcorporaties en gemeenten betalen op gegarandeerde leningen. Op basis van deze resultaten stellen we dat het effect van de verschillende garantiesystemen gelijkwaardig is en dat we de bevindingen voor woningcorporaties kunnen veralgemeniseren naar gemeenten.

De relevantie van de expliciete garantie wordt verder benadrukt doordat de financiële positie van de woningcorporatie uitsluitend van invloed is op de te betalen rente op ongegarandeerde leningen. Dit toont, dat tijdens onze onderzoeksperiode, de bank bij het verstrekken van gegarandeerde kredieten vertrouwt op de achtervang en de toezichthoudende autoriteiten

(Centraal Fonds Volkshuisvesting, Autoriteit Wonen, Waarborgfonds Sociale Woningbouw, Rijk, provincie, gemeenten) en hierdoor geen kredietrisico-opslag vraagt (eliminatie kredietrisico). Bij het verstrekken van ongegarandeerde leningen wordt er wel degelijk naar de financiële karakteristieken gekeken (dit is niet opgenomen in de regressieanalyses).

We benadrukken dat het geenszins de bedoeling is om te stellen dat een expliciete overheidsgarantie altijd wenselijk is, maar eerder dat het niet per sé onwenselijk is.

Het onderzoek naar het garantiestelsel zou aan kracht kunnen winnen door verdere datauitbreiding. Het huidige onderzoek richt zich op leningen van één bank, terwijl corporaties ook aanzienlijke sommen bij andere banken lenen. Ook is het aantal onderzochte langetermijn ongeborgde leningen beperkt, waardoor het effect van het garantiestelsel op de betaalde rente nog niet volledig geïsoleerd kan worden.

Aanvullend onderzoek zou kunnen worden uitgevoerd naar garantiesystemen in andere landen en op welke wijze garanties kunnen worden ontworpen om misbruik te voorkomen. Ook is meer onderzoek wenselijk naar de effecten van expliciete overheidsgaranties en impliciete garanties om een beter begrip te krijgen van de rente op leningen. In de economische literatuur worden met name de negatieve kanten van een garantie belicht, het zou welkom zijn om ook meer aandacht te besteden aan de positieve kanten, het creëren van een gelijk speelveld met een makkelijke toegang tot geld tegen lage renten, rekening houdend met een adequate institutionele setting.

De doelmatigheid van verschillende typen van LO (Hoofdstuk 5)

Het bestaan van risicovrij krediet, als gevolg van overheidsgaranties, brengt met zich mee dat de doelmatigheid van verschillende LO met elkaar vergeleken kan worden. In de afwezigheid van kredietrisico wordt de rente op een lening bepaald door de modaliteiten van de lening, de marktomstandigheden en de moeite die de debiteur neemt om een goede rente af te sluiten. Met voldoende data kan er voor de eerste twee determinanten gecorrigeerd worden, de gedane inspanningen moeten geschat worden. Indien gemeentelijke samenwerkingsverbanden systematisch meer rente betalen dan gemeenten voor gelijkwaardige leningen, zou dit kunnen duiden op een operationele ondoelmatigheid. Dit is een bijzonder relevant onderwerp. In veel landen zoeken LO naar mogelijkheden om diensten doelmatiger te verlenen. Als we naar gemeenten kijken zijn twee mogelijke oplossingen voor dit probleem, fusies en gemeentelijke samenwerking. De keus voor een van deze opties heeft gevolgen voor de doelmatigheid van de nieuwgevormde entiteit. Fusies leiden vaak tot openbare weerstand omdat gemeenschappen een verlies aan identiteit en autonomie vrezen. Hierbij komt dat een fusie een bot instrument is. De diensten die door gemeenten worden geleverd zijn heterogeen. Waar sommige (b.v. kapitaalintensieve) diensten op een optimale schaal opereren, kan dat weer voor andere diensten geheel niet het geval zijn. Door als geheel op te schalen kan dit leiden tot doelmatigheidswinsten in sommige diensten en een verlies in andere. Ook kan een fusie leiden tot meer bureaucratie. Grote gemeenten zouden moeilijker in staat zijn om het lokaal aanbod aan te laten sluiten op de lokale vraag.

Gemeentelijke samenwerking biedt gemeenten de mogelijkheid om schaalvoordelen te behalen op de gewenste dienstverlening, waarbij de optimale schaal voor andere diensten bewaard blijft, hierbij blijft de lokale autonomie behouden. De samenwerking kan ook leiden tot minder doelmatigheid. De corporate governance theory voorspelt dat samenwerking de “agency” kosten doet toenemen en het toezicht op de openbare diensten vermindert. Een

controlesysteem waarbij toezicht gecombineerd wordt met straffen en beloningen is nodig om de belangen van ambtenaren en burgers op een lijn te krijgen.

De *agency theory* geeft drie mogelijke redenen voor een verminderd toezicht en hiermede een lagere efficiency in gemeentelijke samenwerkingsverbanden: het bestaan van meerdere managementlagen; de beperkte invloed van het gemeentebestuur op het bestuur en de uitvoering van het samenwerkingsverband; en gedeeld eigendom/meerdere deelnemers. Als gedeeld eigendom een reden zou kunnen zijn voor de hogere renten, dan zouden we verwachten dat gemeentelijke samenwerkingsverbanden met meer deelnemers een hogere rente betalen. Met meer deelnemers, komen de effecten van inspanningen om doelmatigheid te verbeteren in steeds mindere mate terecht bij de gemeente die zich hiervoor inspant, waardoor de motivering om energie te stoppen in toezicht afneemt (de wet van 1/n).

De invloed van onderhandelen op de rente

Minder toezicht kan leiden tot een hogere te betalen rente als de afwezigheid van beloningen of straffen als gevolg heeft dat er minder moeite gedaan wordt om een beste rente voor de organisatie te realiseren. Medewerkers van de klantendesk van een bank, die de leningen verstrekken, hebben ook commerciële doelstellingen. De rentevoet op een lening, in deze oligopolistische markt, kan binnen een smalle marge variëren (indicatief 10 bp). Dit is het gevolg van een onderhandelingsproces. De bank houdt bij welke leningen er succesvol worden afgesloten en welke er gemist worden. Als er veel leningen gemist worden kan dat een reden zijn om het algemeen renteniveau voor te verstrekken leningen iets omlaag te brengen. Deze faal en succes scores worden ook op klanten niveau bijgehouden. De klantendesk is goed op de hoogte van de aard en de doortastendheid van individuele klanten en zal mogelijkheden vinden om de commerciële doelstellingen te halen. Klanten die altijd

een eerste rente-aanbod accepteren of aanbiedingen van dezelfde bank, loyale klanten, eindigen uiteindelijk met een hogere rente. Deze hogere rente kan geïnterpreteerd worden als een vorm van ondoelmatigheid, omdat er geen economische reden is om het zo te doen.

Renteverschillen op gelijkwaardige leningen worden in de Nederlandse situatie, met name bepaald door de inspanningen van de LO (door onderhandelingen) om een betere rente te verkrijgen. De mate waarin ze daar in slagen wordt gebruikt als een maatstaf voor doelmatigheid. We onderzoeken eerst of GS een hogere rente betalen dan gemeenten op gelijkwaardige leningen. Indien dit het geval is, gaan we nader onderzoeken wat hier de reden voor zou kunnen zijn. Dit doen we met vier aanvullende onderzoeksvragen: Betalen gegarandeerde publieke deelnemingen dezelfde rente als publieke lichamen? Heeft het zin om te investeren in mankracht om een lagere rente te bewerkstelligen? Speelt het aantal deelnemers in een gemeenschappelijke regeling een rol in de rente die betaald wordt (een fenomeen dat de wet van 1/n wordt genoemd)? Betalen onlangs geherindeelde gemeenten meer rente dan gemeenten die dat niet zijn?

Om te beginnen, in ons onderzoek vinden we dat gemeentelijke samenwerkingsverbanden consistent meer rente betalen dan gemeenten. Om dit beter te kunnen begrijpen hebben we de gemeentelijke samenwerkingsverbanden onderverdeeld in gegarandeerde publieke deelnemingen (vallen onder privaatrecht) en publieke lichamen (vallen onder publiekrecht). De publieke deelneming kan in financiële gebreke geraken waardoor er mogelijk door de bank kosten gemaakt moeten worden om de garanties te innen. Een publiek lichaam kan per definitie niet in financiële gebreke raken. Mogelijk vraagt de bank daarom een rente-opslag aan publieke deelnemingen. We vinden echter geen significant verschil in rente die publieke lichamen en gegarandeerde publieke deelnemingen betalen. Wat dat betreft is dit geen

verklaring waarom gemeentelijke samenwerkingsverbanden meer betalen. We zouden dit verschil dus kunnen interpreteren als een verschil in doelmatigheid.

Ten tweede, de te betalen rente is het resultaat van een onderhandelingsproces met de bank, hetgeen kostbaar kan zijn. Het vereist kennis van de kredietmarkten en de huidige condities om te kunnen onderhandelen. Indien de kosten van het investeren in betere onderhandelingen zwaarder wegen dan de baten als gevolg van de rentevoordelen, dan is hier geen sprake van ondoelmatig lenen, zelfs als de rente wat verder verlaagd zou kunnen worden. We tonen aan dat dit niet het geval is. Een simpele berekening laat zien dat de voordelen van een lagere rente veel groter zijn dan de kosten die nodig zijn om dit mogelijk te maken. Als gevolg hiervan interpreteren we de hogere rente die door gemeentelijke samenwerkingsverbanden betaald wordt als een vorm van ondoelmatigheid.

Ten derde hebben we onderzocht in hoeverre het aantal deelnemers in een GS van invloed is op de te betalen rente. We vinden echter geen verband tussen het aantal deelnemers en de te betalen rente, waardoor er geen steun is voor de wet van 1/n. Dat wil nog niet zeggen dat gedeeld eigendom niet leidt tot een “free riders” probleem, er kan immers een tegengesteld effect zijn waardoor het netto-effect nul is. Zo is het denkbaar dat het samenwerkingsverband doelmatiger moet worden ingericht om te voorkomen dat deelnemers afhaken en het verband verlaten. Ondanks dit alles, wijzen onze resultaten erop dat het de samenwerking is die leidt tot hogere renten en niet het aantal deelnemende partijen. Hierdoor ligt de meest waarschijnlijke verklaring bij de toevoeging van extra hiërarchische lagen en het beperkt toezicht van het gemeentebestuur.

Als laatste onderzoeken we de effecten van een herindeling van gemeenten op de te betalen

rente. Herindelingsprocessen gaan gepaard met veel tijd en energie ten koste van de operationele processen. We vinden hier echter geen verschil in rente tussen gemeenten en geherindeelde gemeenten, zelfs niet op de korte termijn.

Als een onvoldoende bestuurlijk toezicht en het bestaan van meerdere managementlagen de belangrijkste redenen zijn voor de mate van ondoelmatigheid en hiermede de hogere rente die gemeentelijke samenwerkingsverbanden betalen, zoals de *agency theory* en onze resultaten veronderstellen, dan kunnen dergelijke vormen van ondoelmatigheid ook elders in de organisatie voorkomen.

Het onderzoek naar de efficiency van verschillende typen LO zou aan kracht kunnen winnen door verdere datauitbreiding. Het huidige onderzoek richt zich op leningen van één bank, terwijl LO ook aanzienlijke sommen bij andere aanbieders van geld lenen.

Aanvullend onderzoek is nodig om te bezien of de ondoelmatigheden verder reiken dan uitsluitend op de te betalen rente, met wellicht een veel grotere budgettaire impact. Hiernaast zou het interessant zijn om onze methode toe te passen in andere landen waarin vergelijkbaar onderzoek heeft plaatsgevonden en de resultaten te vergelijken.

Het optimale moment om een lening af te sluiten (Hoofdstuk 6)

Gemeenten hebben weinig mogelijkheden om de rente die ze op leningen moeten betalen te beïnvloeden. Los van enige onderhandelingsruimte zijn ze veelal afhankelijk van het renteaanbod van de bank en van de marktomstandigheden. Een onderwerp dat op menig financiële afdeling veel aandacht krijgt is of er een optimaal moment kan worden gevonden

om een lening af te sluiten en zich van een lage rente te verzekeren (ten opzichte van gewoon het moment afwachten tot dat het geld nodig is). Een lagere rente werkt meteen door in het beschikbare budget en biedt mogelijk meer financiële ruimte om publieke voorzieningen te realiseren. Omdat Nederlandse gemeenten onder een overheidsgarantie geld lenen, kunnen leningen op korte termijn worden afgesloten. Banken die geld uitlenen aan gemeenten hoeven geen tijdrovende kredietrisicobeoordelingen uit te voeren. Een telefoontjes of een e-mail is voldoende om een lening af te sluiten die dezelfde dag begint. Dit stelt gemeenten in staat om nauwgezet het moment te bepalen waarop een lening wordt afgesloten. In sommige gevallen is het van tevoren bekend wanneer er geld nodig is. Zo weten organisaties ver van tevoren wanneer leningen vervallen en moeten worden geherfinancierd. Ook bij het doen van grote investeringen is het meestal van tevoren bekend wanneer de betalingen uiterlijk gedaan moeten worden. Dit biedt de mogelijkheid aan de debiteur om het moment te bepalen waarop de lening wordt afgesloten. In plaats van wachten totdat de middelen noodzakelijk zijn (en er betaald moet worden) kan een lening eerder worden afgesloten, gebruikmakend van een lening met een uitgestelde storting. Hierbij wordt de rente bepaald op het moment van afsluiten.

In Nederland wordt bij gemeentefinanciering vaak gebruik gemaakt van leningen met uitgestelde stortingen. Er zijn meerdere beweegredenen om dergelijke leningen af te sluiten. In eerste plaats is het direct afsluiten van leningen aantrekkelijk voor risico-averse debiteuren. Door de lening meteen af te sluiten wanneer het duidelijk is dat er krediet nodig is, wordt een kostenstijging als gevolg van een stijgende rente voorkomen. Een andere administratieve reden kan zijn dat de besluitvorming met betrekking tot de goedkeuring van een lening en het bijbehorend rentepercentage niet gelijkloopt met de datum waarop er betaald moet worden. In een dergelijk geval kan een uitgestelde storting een uitkomst zijn. Als laatste en het meest relevant voor dit onderzoek, kan een uitgestelde storting gebruikt worden door debiteuren die

een stijging van de rente verwachten. Door de lening meteen af te sluiten, tegen de huidige rente, kan de lening goedkoper worden dan wanneer er gewacht wordt tot het uiterst betaalmoment, ervan uitgaande dat de debiteur gelijk heeft gekregen. Leningen met een uitgestelde storting kennen doorgaans een kleine opslag voor de financieringskosten die de bank moet maken om middelen op een latere datum beschikbaar te hebben.

De wetenschappelijke literatuur toont dat het moeilijk is om een betere voorspelling te doen van de rente dan een voorspelling die gelijk is aan de huidige rentestand. Of anders gesteld, de beste voorspelling van de rente van morgen, is de rente van vandaag. Dat wil nog niet zeggen dat het onmogelijk is om een strategie te vinden waardoor een beter instapmoment wordt gevonden die leidt tot een lagere rente. Bijvoorbeeld, is het zinvol om in een periode van wisselvallige renten te wachten tot de rente iets lager is?

Wij onderzoeken of de te betalen rente op leningen kan worden geoptimaliseerd door een juist instapmoment te vinden binnen een 20-daags tijdspanne (20 werkdagen, bij benadering een kalendermaand). Dit vraagstuk valt onder de "optimal stopping" problemen, waarbij een onomkeerbare keuze gemaakt moet worden in onzekerheid met een beperkte tijdhorizon. Een bekend voorbeeld hiervan is het "secretaresse probleem", waarbij de beste secretaresse gekozen moet worden uit n sollicitanten. De optimale beslisregel is om de eerste n/e[57] kandidaten te bekijken en vervolgens de eerste kandidaat te kiezen die beter is dan de beste kandidaat tot dat moment.
Ons vraagstuk verschilt met betrekking tot sommige aannames en doelstellingen van dit probleem. Desalniettemin is het interessant om te bezien of een dergelijke strategie behulpzaam kan zijn bij het vinden van een juist instapmoment.

[57] n = het aantal kandiaten en e = de basis van een natuurlijke logaritme, bij benadering 2,72

In ons onderzoek maken we gebruik van eenvoudige strategieën die tegen lage kosten te implementeren zijn. We simuleren deze strategieën over de dagelijkse rentestanden van de afgelopen decennia om de resultaten te meten.

De strategieën

1) De eerste strategie is een passieve strategie, we kijken terug over een zekere tijdspanne (van 1 tot 20 werkdagen) en bepalen de beste rente in die periode, deze rente wordt vastgesteld als de referentierente voor de komende beslissingsperiode (eveneens 20 werkdagen). De lening wordt afgesloten op het moment dat de huidige rente lager of gelijk is aan de referentierente. Als dat niet het geval is, wordt de lening op de laatst mogelijke dag afgesloten.

2) De tweeede strategie is een variant hierop, het is een actieve strategie waarmee we bedoelen dat de referentierente op iedere dag opnieuw wordt vastgesteld.

3) De derde strategie maakt gebruik van de drift van de markt, dat wil zeggen het positieve of negatieve verschil tussen een rente in het verleden (1 tot 20 dagen) en de rente aan het begin van de beslisperiode. Als de drift omhoog is wordt de lening meteen afgesloten, als deze omlaag is wordt de lening op de laatst mogelijke dag afgesloten.

4) De vierde strategie volgt de klassieke secretaresse strategie. Hierbij wordt geen gebruik gemaakt van historische data, maar wordt een wachtperiode gecreëerd (van 1 tot 20 dagen) waarbinnen de beste rente als referentierente wordt vastgesteld. De lening wordt afgesloten op het moment dat de huidige rente in de volgende resterende beslisperiode (20 dagen minus wachtperiode) gelijk of lager is dan de referentierente. Als deze situatie zich niet voordoet wordt de lening op de laatst mogelijke dag afgesloten.

5) De laatste strategie is het makkelijkst, altijd de lening afsluiten op hetzelfde moment in de beslisperiode, altijd op dag1 of dag 2 of een andere vaste dag.

De doelen en resultaten

Om de resultaten van de strategieën te meten zijn 4 doelen gesteld. Deze doelen zijn:

1) Alleen voor de laagste rente gaan.
2) Voor een gemiddelde lage rente gaan.
3) Gaan voor de laagste ratio tussen de gekozen rente en de laagste rente in de periode.
4) De standaarddeviatie van de strategie minimaliseren.

De resultaten van de strategieën zijn als volgt (tussen haakjes staat het optimale aantal terugkijk/wacht dagen):

Tabel S.1 vat de uitkomsten samen voor vijf jaars leningen (vaste rente, aflossing aan einde looptijd).

	Beste		Op één na beste		Slechtste	
Doel	Strategie	Resultaat	Strategie	Resultaat	Strategie	Resultaat
1 Het vaakst de laagste rente gekozen	4(16)	24,4%	5(20)	17,2%	5(11)	2,9%
2 Gemiddeld de laagste rente gekozen	4a(8)	3,456%	3(20)	3,459%	5(1)	3,485%
3 Laagste (gekozen rente/laagste beschikbare rente)	4a(8)	103,5%	3(20)	103,9%	5(1)	105,0%
4 Laagste standaarddeviatiatie gekozen rente	5(6)	1,363%	1(2)	1,364%	4(16)	1,384%

Als we kijken naar doel 1, dan wordt met strategie 4(16), de secretaresse strategie met 16 dagen wachttijd, een optimaal resultaat gehaald met 24% laagste renten. Dit doel zegt niet wat er geoptimaliseerd wordt indien niet de laagste rente wordt gekozen en daarom is doel 2 opgenomen; hierbij wordt met strategie 4a(8) een optimaal resultaat gehaald, met de secretaresse strategie (a = in de variant uitsluitend lager) wordt na 8 dagen wachttijd, een gemiddelde laagste rente gekozen. Nadeel van dit doel is dat de renten over de onderzoeksperiode wisselvallig zijn waardoor resultaten naast de strategie ook door marktontwikkelingen worden gedreven. Om deze reden is doel 3 opgenomen. Het derde doel lijkt het meest relevant voor organisaties. Dit doel minimaliseert de ratio tussen de gekozen rente en de laagst mogelijke rente in de beslisperiode. Bijvoorbeeld, een ratio van 103.5 wil zeggen, dat wanneer de beste rente in de periode 4% is, de verwachte geselecteerde rente 4.14 is. Indien het verschil tussen de beste en de slechtste strategie 1.5% is, impliceert dit met een beste rente van 4%, een verwacht verschil van zes basispunten (0.06 procent punt).

Een strategie kan dan wel een goede gemiddelde ratio opleveren, een gemiddelde kan echter opgebouwd zijn uit wisselvallige uitkomsten, waardoor het risico toeneemt. Daarom is ook doel 4 opgenomen, om aan te geven welke strategie de laagste standaarddeviatie geeft.
De goede resultaten van de secretaresse benadering zijn opmerkelijk. In veel gevallen scoort deze beter dan strategieën die gebruik maken van historische informatie. Deze conclusies voor vijf jaars leningen (vaste rente, aflossing einde looptijd) gelden ook voor de andere onderzochte looptijden (10, 15, 20 en 25 jaar) en aflossingspatronen. De gemeten standaarddeviatie van de verschillende strategieën over de gehele onderzoekperiode liggen allen boven de 100 basispunten, waarbij alle strategieën bij benadering even risicovol zijn. Verschillen in uitkomsten tussen de strategieën zijn echter relatief beperkt: gemiddeld minder dan drie basispunten. Daar moet de renteopslag van ongeveer één basispunt nog van af, die de bank kan rekenen om een uitgestelde lening af te sluiten. Deze kosten en baten vallen echter in het niet bij de variatie van de uitkomsten, dat wil zeggen de standaardafwijking.

Voor een individuele lening wordt de waarschijnlijkheid dat een strategie, binnen een 20-daags tijdspanne, significant beter presteert dan een andere klein geacht. We concluderen hierbij dat organisatorische en gedragsmatige redenen om een lening binnen een kalendermaand op een bepaald moment af te sluiten geen effect hebben op de verwachte financiële resultaten. Zo kan in gevallen dat een projectbegroting is goedgekeurd het verstandig zijn om de lening meteen af te sluiten zodat de rentelasten nog in het budget passen. Hierdoor kunnen stijgende renten het project niet meer in gevaar brengen. Meer in het algemeen zullen risico-averse mensen beslissen om zo snel mogelijk af te sluiten en risico-neutrale mensen zo laat mogelijk om kosten die gepaard gaan met uitgestelde stortingen te vermijden. Het is prettig om te weten dat dit geen effect heeft op het verwachte financiële resultaat.

Wie echter voor de strategie wil gaan die het beter heeft gedaan dan de andere strategieën die we hebben beschouwd kiest voor de secretaresse strategie. Die belooft goede resultaten voor verschillende looptijden en verschillende optimaliseringsdoelen, terwijl geen gegevens over rentetarieven uit het verleden nodig zijn.

Het onderzoek naar het vinden van een optimaal moment om een lening af te sluiten zou aan kracht kunnen winnen door verdere datauitbreiding met marktrenten en nieuwe strategieën. Het huidige onderzoek richt zich uitsluitend op BNG Bank renten en vijf strategieën, het zou interessant zijn om te weten of de gevonden resultaten ook dan overeind blijven.

Aanvullend onderzoek zou kunnen worden uitgevoerd op de toepasbaarheid en het effect van "optimal stopping" oplossingen zoals die bij het secretaresseprobleem op andere optimaliseringsprocessen binnen een gemeente met een beperkte tijdspanne. Misschien dat deze bevindingen kunnen helpen om budgettaire beslissingen verder te verbeteren.